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USSR Report

CHEMISTRY

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6 March 1984

USSR REPORT
CHEMISTRY

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ANALYTICAL CHEMISTRY

UDC 533.92:616.366-0.02

USE OF LOW-TEMPERATURE PLASMA IN PHYSICAL CHEMICAL ANALYSIS OF BIOLOGICAL OBJECTS

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 56, No 10, Oct 83
(manuscript received 4 Feb 82) pp 2333-2337

KRAPIVINA, S. A., GUSEVA, Ye. S., GAVRILENKO, I. B. and TARASOV, V. A.

[Abstract] The important procedure of eliminating organic impurities during experiments can often be accomplished using plasma oxidation methods without damaging inorganic structures. The present study concerns the biochemical composition and structure of gallstones as a factor in their formation. Low-temperature plasma was used to prepare the biological specimens for spectral analysis. Plasma was generated by high-frequency glow discharge with oxygen as the gas. Gallstones were pulverized and placed in quartz cuvettes. Infra-red and plasma spectroscopic study of 100 specimens revealed 7 varieties, containing such substances as cholesterol and inorganic Ca and Mg salts, protein-cholesterol organic bases, calcite, dolomite, sulfates and calcium orthophosphate, and related compounds. The low-temperature plasma procedure was judged to be instrumental in enriching inorganic phases without changing their crystalline and chemical properties. Figure 1; references 4: 3 Russian, 1 Western.
[82-12131]

UDC 537.531.8:(546.19'22+546.19'23)54-161.6

EVALUATION OF DEGREE OF CHEMICAL ORDERING IN GLASSES OF As-S AND As-Se SYSTEMS USING X-RAY SPECTRAL DATA

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 3, Nov 83
(manuscript received 17 Feb 83) pp 656-659

MAKAROV, L. L., BATRAKOV, Yu. F., ZAYTSEV, Yu. M., GUTENEV, M. S. and KHRAMTSOV, K. G., Leningrad State University imeni A. A. Zhdanov

[Abstract] The method of chemical shift of X-ray lines can provide information both on the electron state of atoms and on the degree of ordering of transitional phases of glass. The present study reports on chemical shift data

as a measure of the transition from crystal to glass and for numerical assessment of the ordering factor in crystals and glasses of As-S and As-Se systems. Study of X-ray line data for systems such as $\text{As}_{40}\text{Se}_{60}$, $\text{As}_{38}\text{Se}_{57}\text{Sn}_5$ and $\text{Ge}_{19}\text{Se}_{76}\text{In}_5$ show changes from chaotic states to ordered structures in glass formation, and agree with infrared and Raman spectral data. Figure 1; references 6: 2 Russian, 4 Western.
[75-12131]

UDC 546.264

STUDY OF CO_2 DECOMPOSITION IN SILENT DISCHARGE

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 1, 1983 pp 15-17

MAMEDOVA, E. D. and ADZHAMOV, K. Yu., Azerbaijan Institute of Petroleum and Chemistry imeni M. A. Azizbekov

[Abstract] Study of CO_2 dissociation in a silent electrical discharge involved analysis of carbon dioxide (95 percent pure) by gas adsorption chromatography and showed that the CO_2 decomposition reaction proceeds by $\text{CO}_2 \rightarrow \text{CO} + 1/2 \text{O}_2$. The degree of CO_2 decomposition and the composition of gases in the circuit at the time of reaction depend upon the voltage applied. At 8 kv, 34 percent of the initial gas dissociates and, at 14 kv, 50 percent dissociates. The previously derived assumption that the quantity of reacting substance is proportional to the energy expended in the discharge was confirmed, in these experiments, up to 14-15 kv but the degree of CO_2 dissociation was stationary at higher voltages. Maximum degree of CO_2 dissociation (50 percent) was achieved at a rate of circulation of 80 l/hr. Figures 2; references 6: 4 Russian, 2 Western.
[63-2791]

UDC 628.2

DETERMINING AMOUNTS OF BOUND WATER IN PRECIPITATES OF INDUSTRIAL EFFLUENT

Kiev KHIMIYA I TEKHOLOGIYA VODY in Russian Vol 5, No 5, Sep-Oct 83
(manuscript received 19 Jul 82) pp 423-425

KAZANSKIY, V. M., POTAPENKO, G. D. and PIROGOV, L. G., Kiev Construction Engineering Institute

[Abstract] Processing of industrial effluent waste water includes elimination of moisture from finished products, which causes special difficulties, due both to the cost of thermal drying and to complexities in measuring the presence of moisture. The present study furthers investigation of a drying thermogram method for measuring moisture in clay. Research conducted on

mineral and organic residues from the Lublin Forging Plant using biological purification to remove iron and chromium precipitates showed that the moisture content of organo-mineral waste water residues depended on the method of processing. Anaerobic fermenting of slime had no practical impact, but adding perlite changed the adsorbed moisture significantly. Monolayer moisture was reduced by a factor of 6, while polylayer moisture remained unchanged. Heat processing reduced the content of immobilized moisture without changing product microstructure. Perlite changed the latter as well. Figure 1; references 3 Russian.
[54-12131]

UDC 628.312

DETERMINING ORGANIC COMPOUND CARBON IN EFFLUENT FROM SYNTHETIC RUBBER ENTERPRISES

Kiev KHIMIYA I TEKHOLOGIYA VODY in Russian Vol 5, No 5, Sep-Oct 83
(manuscript received 17 Jun 82) pp 437-440

YAKUBENOK, E. F., SVATIKOV, V. P., SOBSTYL', G. A., SAVEL'YEVA, V. N. and ZHURAVLEVA, All-Union Scientific Research Institute for Synthetic Rubber, Voronezh Branch; Voronezh Technological Institute

[Abstract] General contamination of waste waters with organic compounds has often been determined by the chemical oxygen consumption method, which requires much time, labor and scarce reagents. The present study reports on findings using variations of a general organic carbon procedure, and especially the simplest wet oxidation and chromatography method. This method is readily employed since most rubber plants are already equipped for gas chromatography operations, but it has shortcomings, including problems with the typical glass oxidizing devices and insufficient effectiveness of oxidation without a catalyst. The authors tested a stainless steel apparatus, which is diagrammed and described. Rubber plant waste water, treated with potassium persulfate, H_3PO_4 and Ag_2SO_4 , was assessed. In another variant, silver nitrate replaced the silver sulfate, with similar effectiveness. All but aromatic carbon compounds oxidized completely, and calculations showed the mix of carbon compounds in the rubber plant effluent accurately. The proposed apparatus was reliable and simple to use, and the outlined general organic compound method is recommended for use at rubber and petroleum production enterprises. Figures 3; references 15: 9 Russian, 1 Hungarian, 5 Western.
[54-12131]

EFFECTS OF ORGANIC ADSORBATES ON PROTEON MAGNETIC RESONANCE OF POLYMERIC ION EXCHANGERS AND EXCHANGER-BOUND WATER

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 57, No 11, Nov 83
(manuscript received 12 Jul 82) pp 2890-2891

LIFSHITS, M. I. and KOMAROV, Ye. V., All-Union Scientific Research Technologic Institute of Antibiotics and Enzymes for Medical Use, Leningrad

[Abstract] Proteon magnetic resonance spectroscopy demonstrated that adsorption of organic molecules (inosine, neomycin) to polymeric ion-exchange-resins markedly altered the temperature dependent line widths of water-swollen resins KB-2 (H^+ , Na^+ , NH_4^+ forms) and KU-2-8 (H^+ form), as well as of the polymer-bound water. In the absence of the adsorbate the line spread of the ion-exchange-resins and of the bound water does not depend on temperature in the 20-100°C range, but widens two-fold at 20°C by adsorption of neomycin to KB-2. Consequently, evaluation of the protein magnetic resonance line widths can be used as a criterion for determining the extent of adsorbate binding to an ion-exchange-resin. Figures 2; references 4: 1 Russian, 3 Western.
[86-12172]

NEW METHOD OF GAS CHROMATOGRAPHIC SEPARATION OF ISOTOPE-SUBSTITUTED COMPOUNDS IN GLASS CAPILLARIES

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 57, No 11, Nov 83
(manuscript received 23 Jun 82) pp 2897-2899

STERKHOV, N. V., RAVIKOVICH, V. M., LITVIN, Ye. F. and CHIZHKOV, V. P., Institute of Organic Chemistry imeni N. D. Zelinskiy, USSR Academy of Sciences, Moscow

[Abstract] Description is provided of a new gas chromatographic method for the separation of isotope-substituted compounds approaching 16,000,000 theoretical plates in efficiency. The method is based on a previously described circulating capillary apparatus [Chizhkov, VP, E. al., Zh. Fiz. Khim., 43(4):1053, 1969], using an eight-channel stopcock together with the basic Biokhrom-1 chromatograph. Mixtures of cyclohexane-dodecadeuterocyclohexane were separated in the capillary tubes filled with OV-101 liquid phase, along with determination of the temperature dependence of the separation coefficient (α) for this mixture in the 22 to 180°C interval, with $\alpha(C_6D_{12}-C_6H_{12})$ ranging from 1.069 at 22°C to 1.032 at 180°C. Figures 3; references 24: 12 Russian, 12 Western.
[86-12172]

CHEMICAL ASSEMBLY OF INORGANIC MATRICES FOR SOLID-PHASE SYNTHESIS OF PEPTIDES

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 56, No 10, Oct 83
(manuscript received 3 Jun 82) pp 2387-2389

POSTNOV, V. N. and KOL'TSOV, S. I., Leningrad State University

[Abstract] One of the promising methods of preparing synthetic peptides, which are used in biomedical research, is the proposed Merrifield synthesis on organic polymeric matrices. However, inorganic matrices such as porous glasses and silicons have superior mechanical and chemical durability and rigidity in various solvents compared to organic counterparts. The authors developed such matrices with larger capacities using carriers with higher content of hydroxyl-groups activated by triethylamine and synthesized "anchor groups" established by chemical assembly. The high-porosity silica gel carrier had 3.57 mg. equiv./g⁻¹. The chemical assembly method made it possible to use highly reactive beta-phenylethyltrichlorosilane from a 10% benzene solution at 80°C in the presence of triethylamine for 3 hours. The time required was found to be far less than that needed when a chloromethylated styrene copolymer is used with divinylbenzene in the process. The resulting matrices had the greater capacity of organic counterparts with the advantages of inorganic types. References 9: 6 Russian [1 translation from English], 3 Western.
[82-12131]

CATALYSIS

UDC 542.973

FRAMPTON METHOD FOR PREPARING CATALYSTS

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 56, No 10, Oct 83
(manuscript received 13 May 82) pp 2369-2371

DRUZ', V. A. and UDARTSEVA, G. G., Kazakh State University imeni S. M. Kirov

[Abstract] The authors report on the effect of the degree of washing of palladium catalyst prepared by the Frampton method on the activity of palladium pigment in hydration and oxidation applications. Sodium ions, NO_3^- content and pH of rinse water before and after use, and catalyst activity in oxidizing isobutylene were determined. Reduction of palladium oxide to the metal was found to take place concurrently with reduction of the NO_3^- anion to ammonia. After this stage no oxidation of isobutylene took place. Results indicated that content of sodium nitrate in rinse water must be limited to no more than 10^{-5} kg/m³. The NO_3^- impurities have a direct impact on catalyst activity by forming ammonia that adsorbs on the catalyst surface. Figures 4; references 3: 2 Russian, 1 Western.
[82-12131]

UDC 541

CRYSTALLOCHEMICAL REACTIONS IN BINARY SYSTEMS OF VANADIUM CATALYSTS $\text{V}_2\text{O}_4\text{-K}_2\text{SO}_4(\text{Al}_2\text{O}_3)$ AND $\text{V}_2\text{O}_5\text{-K}_2\text{SO}_4(\text{Al}_2\text{O}_3)$

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 3, Nov 83
(manuscript received 4 Apr 83) pp 639-643

BEREZHNOY, A. I. and POLUKHIN, Yu. M., All-Union Polytechnic Correspondence Institute, Moscow

[Abstract] Industrial catalysts based on vanadium generally are used in solid multicomponent matrices where the vanadium oxide behaves differently from pure oxides. Adjacent crystals of the same crystallochemical type may reduce and lead to a drop in elastic tension in the remaining structure. The present study reports on reduction of V_2O_5 in a $\text{V}_2\text{O}_5\text{-K}_2\text{SO}_4$ system through thermal treatment, even in a normal atmosphere. Absorption infrared spectrometry on a "S!ekord" spectrometer showed the changes resulting from thermal treatment to

be related to oxidation of V_2O_4 to V_2O_5 , and the reverse reduction of V_2O_5 to V_2O_4 , through an intermediate transitional compound. K_2SO_4 is a catalyst for these conversions into a third vanadium oxide. Figures 2; references 5: all Western.
[75-12131]

UDC 547.217.4:542.952:66.095.217.3

ACTIVITY OF ALUMINUMFLUOROPLATINUM CATALYST IN ISOMERIZATION OF n-DECANE

Moscow NEFTEKHIMIYA in Russian Vol 23, No 5, Sep-Oct 83 (manuscript received 24 Feb 82) pp 610-616

ZADYMOV, V. V., KONOVAL'CHIKOV, O. D., KALIKO, M. A., KRUGLIKOV, V. Ya. and ALEKSEYENKO, L. N., All-Union Scientific Research Institute of Petroleum Refinery

[Abstract] Catalysts used for isomerization of C_{10} - C_{18} hydrocarbons consist of tungsten and nickel sulfides or their compositions with aluminum oxide, amorphous alumo-silicate or fluorinated aluminosilicates. These catalysts facilitate acid-base type reactions along with the hydrogenation-dehydrogenation reactions. The goal of this study was to establish the relationship between these two functions and the activity of the isomerization catalyst, as well as to determine optimal acidity of the aluminum-platinum contact containing various levels of fluorine, which could range from 2 to 34%. n-Decane was subjected to hydroisomerization at 350-390°C and 5 MPa. It was established that under such conditions the active centers participating in the catalytic process are of medium strength. Deposition of 0.6% platinum on aluminum-fluoroxide matrix diminished substantially the contribution of strong acid centers. High reactivity and selectivity of these catalysts is achieved with fluorine concentration of 11-16%. At this point the quantity of platinum corresponds to the number of strong centers and the metallic component has the highest specific surface. Figures 2; references 15: 12 Russian (2 by Western authors), 3 Western.
[66-7813]

UDC 665.654.2:[66.095.217.3 + 66.095.252.73]

ACTIVITY AND SELECTIVITY OF BIFUNCTIONAL CATALYSTS IN HYDROISOMERIZATION AND HYDROCRACKING REACTIONS

Moscow NEFTEKHIMIYA in Russian Vol 23, No 5, Sep-Oct 83 (manuscript received 22 Apr 82) pp 617-621

GZHEKHOVYAK, Ye. R., PNYAK, B., GZHERKHOVYAK, Ye., RADOMYSKI, B. and SHTUBA, Z., Institute of Chemistry and Technology of Petroleum and Gas, Wroclaw, Polish People's Republic

[Abstract] Reactions of individual chemical compounds under standard conditions are generally used as model reactions for evaluation of the activity and

selectivity of catalysts. In the present paper a comparative analysis is reported of two methods used in evaluating hydrocracking and hydroisomerizing properties of bifunctional catalysts: reactions of n-decane at atmospheric pressure and of benzene and cyclohexane at elevated pressures. The following catalysts were studied: 0.3%Co-16%MoO₃ on fluorinated Al₂O₃; 0.4% NiO/16% Al₂O₃-SiO₂; 0.75%Pt/Al₂O₃-HY and 0.75% Pt/Al₂O₃-NiY. It was shown that these reactions could indeed serve as models for evaluating bifunctional catalysts in their cracking and isomerizing effectiveness. n-Decane is the preferred agent for this purpose because the process occurs at atmospheric pressure and allows a more complete characterization of isomerizing and cracking properties of these catalysts. References 3: all Russian. [66-7813]

UDC 665.652.72

SYNTHESIS OF HYDROCARBONS FROM CO AND H₂ OVER Co-MgAl₂O₄ CATALYST

Moscow NEFTEKHIMIYA in Russian Vol 23, No 5, Sep-Oct 83 (manuscript received 6 May 82) pp 628-632

KHLEBNIKOVA, T. V., KHOANG CHONG IYEM and LAPIDUS, A. L., Institute of Organic Chemistry imeni N. D. Zelinskiy, USSR Academy of Sciences

[Abstract] The Co catalyst containing CoAl₂O₄ was shown to be active in synthesis of hydrocarbons from CO and H₂. Addition of 1% MgO to this agent increased its activity considerably. One of the reasons for this could be the formation of Mg-Al or Co-Mg spinel on its surface. To test this, hydrocarbon synthesis from CO and H₂ was studied over Co-MgAl₂O₄ catalyst at 190°C and atmospheric pressure. It was shown that addition of Al₂O₃ to the Co-MgAl₂O₄ contact leads to a lower yield of methane, while addition of 10-30% of MgO increases its activity. The optimal composition of the catalyst was 10 Co: 6 MgO:14MgAl₂O₄. It was shown that on this catalyst the CO is chemisorbed in weakly-bound forms with a 150-275°C desorption temperature; evidently the more that CO is found in weakly-bound form, the more active is the catalyst. Figures 2; references 7: 5 Russian, 2 Western. [66-7813]

UDC 541(127+64):547.362

SPECTROPHOTOMETRIC STUDY OF KINETICS OF POLYMERIZATION OF PROPARGYLIC ESTERS OF PHENOL IN PRESENCE OF MOLYBDENUM PENTACHLORIDE

Ivanovo IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: KHIMIYA I KHIMICHESKAYA TEKHNLOGIYA in Russian Vol 26, No 10, Oct 83 (manuscript received 30 Mar 81) pp 1175-1177

YUSUPBEKOV, A. Kh., ABDURASHIDOV, T. R. and D'YACHKOVSKIY, D. S., Department of Plastics Processing Technology, Tashkent Polytechnic Institute

[Abstract] Polymerization of acetylene compounds, on molybdenum and tungsten halides as catalysts, has not been thoroughly studied in terms of kinetics.

The authors have studied kinetic patterns of aromatic derivatives of acetylene in molybdenum pentachloride using propargylic esters of phenol, m-methylphenol and p-tertbutylphenol, with carbon tetrachloride as the solvent. The dependence of optical density on time and temperature of reaction and kinetic curves of autocatalytic polymerization suggest that propargylic esters of phenol in the presence of MoCl₅ form an active complex that requires further study. Figures 4; references 8: 3 Russian, 5 Western.
[76-12131]

UDC 541.128.35:546.735

SYNTHESIS AND CATALYTIC PROPERTIES OF COMPLEXES OF TRANSITION METALS, ATTACHED TO THE SURFACE OF OXIDE CARRIERS, PART 9: COMPLEXES OF DICOBALTOCTACARBONYL WITH PHOSPHINATED SILICA GEL AS CATALYSTS OF PROPYLENE HYDROFORMYLATION

Moscow KINETIKA I KATALIZ in Russian Vol 24, No 5, Sep-Oct 83
(manuscript received 27 Oct 81) pp 1105-1110

MOROZ, B. L., SEMIKOLENOV, V. A., LIKHOLOBOV, V. A. and YERMAKOV, Yu. I.,
Institute of Catalysis, Siberian Department, USSR Academy of Sciences,
Novosibirsk

[Abstract] Carbonyl phosphine complexes of cobalt attached to silica gel were obtained and their stability and catalytic properties in the propylene hydroformylating reaction were studied. It was found that the attached carbonyl phosphine complexes of cobalt are stable and active catalysts of propylene hydroformylation in the 393-443 K temperature range at low partial pressure of carbon monoxide ($P_{CO}=0.01-0.6$ MPa). Decarbonylation of the attached complexes occurred at higher temperature. Catalysts containing cobalt on silica gel are inactive in the propylene hydroformylation reaction at pressures used in this study. Figures 4; references 11: 3 Russian, 8 Western.
[62-2791]

UDC 546.92-44 ÷ 541.128

SOME FEATURES OF CATALYTIC CONVERSION OF ORGANOSULFUR COMPOUNDS AND ASPHALTENES OF RESIDUAL FUELS UNDER PRESSURE

Moscow KINETIKA I KATALIZ in Russian Vol 24, No 5, Sep-Oct 83 (manuscript received 4 Mar 82) pp 1115-1120

MILOVA, L. P., LUR'YE, M. A., ZAYDMAN, N. M., VETLUGINA, L. N. and PLYASOVA, L. M., Institute of Catalysis, Siberian Department, USSR Academy of Sciences, Novosibirsk

[[Abstract] Conversion of individual components of residual fuels (organosulfur compounds and asphaltenes) by aluminum-cobalt-molybdenum catalysts with different physical chemical properties was studied. Western Siberian mazut

was used as a typical residual fuel. The diesel fuel fractions were sulfidized at a pressure of H of 10 MPa, at 653K, rate of feed of diesel fuel of 100 ml/hr and H₂/crude ration of 1000 nl/1 in 24 hours. Conversion of colloid particles of mazut asphaltenes under pressure by stationary porous catalysts differed fundamentally from conversion of molecules of ordinary dimensions in a state of true solution. The principle differences in conversion of organosulfur compounds and asphaltenes by the heterogeneous catalysts studied were caused by the colloid nature of the asphaltenes. The degree of utilization of the whole grain during asphaltene hydrogenation increased from 0.16 to 0.5 with the increase of volume of the pores from 0.1 to 0.5 cm³/g but remained almost unchanged in the desulfidizing reaction. These principles must be considered during development of catalysts for converting residual fuels since the presence of asphaltene in the crude reduces the activity of catalysts including those used in subsequent phases of processing residual fuels. Figures 4; references 11: 9 Russian, 2 Western. [62-2791]

UDC 541.128:543.422.4

EFFECT OF CHEMISORBED WATER ON ACTIVITY OF SUPERHIGH-SILICON CATALYSTS FOR HYDROCARBON CRACKING

Moscow KINETIKA I KATALIZ in Russian Vol 24, No 5, Sep-Oct 83
(manuscript received 19 Feb 82) pp 1121-1127

ZADYMOV, V. V., KALIKO, M. A., VOLKOV, V. Yu. and FEDOROVA, L. A., All-Union Scientific Research Institute of Oil Refining, Moscow

[Abstract] Activity of superhigh-silicon zeolites in model reactions of dealkylation of isopropylbenzene and cracking of n-heptane at 400° and 470° respectively as a function of temperature of calcination of samples were studied to determine the distribution according to activity and spatial distribution of catalytic centers in the structure of these high-silicon catalysts and the effect of adsorbed water on their catalytic activity. Rates of reduction of activity of these hydrocarbons differed during reduction of water content from 0.5 to 0.08 wt. percent. It was assumed that this was due to different spatial arrangement for the structure of zeolite of the active centers, interacting with heptane and cumene. The catalytic activity of superhigh-silicon zeolite in n-heptane cracking was retained only after processing in dry air or vacuuming even after its calcination at 950°. It was found that chemisorbed water in superhigh-silicon zeolites affects, in different ways, formation of active centers with which molecules of hydrocarbons of various size react. The ratio of water temperature to temperature of calcination of the zeolites is especially important for stabilizing the activity in cracking. Figure 1; references 18: 9 Russian, 9 Western. [62-2791]

SELECTION OF CATALYTIC SYSTEMS FOR OXIDATIVE CHLORINATION OF METHANE IN PSEUDO LIQUEFIED LAYER

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 10, Oct 83 pp 584-587

ROZANOV, V. N., GVOZD, Ye. V., TREGER, Yu. A. and BABICH, N. F.

[Abstract] The goal of the present study was to select optimal catalysts for oxidative chlorination of methane. The catalysts were prepared by exhaustive saturation of the carriers with solutions of active salts followed by drying at 120-130°C. Activity of the catalysts increased uniformly with increased quantity of the active mass (up to 8%) of CuCl_2 , KCl and LaCl_3 on the silica gel (used as carrier) with a 250 m^2/g specific surface. Optimal particle size of the catalyst was in the range of 100-250 μm . Maximum conversion of HCl occurred at 380-400°C with a contact time of 10 s. Comparing various metals, the following order of decreasing activity was noted: $\text{Cu} > \text{Fe} > \text{Cr} > \text{Pd}$. Activity of CuCl catalyst could be further increased by addition of La or Y oxides. Figure 1; references 9: 4 Russian, 5 Western. [61-7813]

UDC 541.135.5

SURFACE STRUCTURE OF ELECTROPRECIPITATED Pd-, Rh- AND Pd-Rh CATALYSTS

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 57, No 11, Nov 83
(manuscript received 7 Jul 82) pp 2731-2735

GRISHINA, T. M. and LEBEDEVA, O. K., Chemical Faculty, Moscow State University

[Abstract] X-ray analysis, electrochemical methods, and electron microscopy were employed in the evaluation of the surface features of Pd-, Rh- and Pd-Rh catalysts prepared by electroprecipitation. Characteristics of the surfaces were found to vary with the composition of the catalysts and the degree of stabilization. In all cases an increase in the concentration of Pd resulted in a decrease in the surface contact area. All of the freshly prepared samples formed a dendritic surface pattern, with the shape of the dendrites, pore size, and interaxial spaces of the dendrites determined by the composition of the catalysts. Surfaces of catalysts with Rh were remarkable for the large number of pores which was directly related to the Rh content, while an increase in the Pd content led to shafts and branches with finer structure and decreased the interdendritic distances. Stabilization of the catalysts (1 N H_2SO_4 at 80°C under hydrogen for 10-20 h, cathodal polarization) had a marked effect on the surface. The changes resulting from recrystallization were more pronounced in compositions with Rh, leading to complete disappearance of the dendritic structure. Recrystallization was less severe with catalysts with a high Pd content, presumably because dissolved hydrogen inhibited such processes. Good agreement was obtained among the three methods used to assess the state of these catalysts. Figures 2; references 21: 20 Russian, 1 Western. [86-12172]

CHEMICAL INDUSTRY

CHEREPOVETS SULFURIC ACID PLANT ON STREAM

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 15 Dec 83 p 1

[Article by N. Nenast'yev, reporter of the newspaper "Kommunist", Cherepovets: "Contract Passes the Test"]

[Text] Cherepovets builders delivered a sulfuric acid plant with a capacity of 360,000 tons a year for operation ahead of schedule.

This complex has already started producing. Its operators are planning to produce about 30,000 tons of sulfuric acid before the end of the year. In the future, each tenth ton of this product produced in the country will be produced by the "Ammonofos" Production Association.

The first tons of acid were produced at the new facility on the eve of the October holiday, much earlier than was planned by the pledges. After that, the builders and installation workers and the operation department were thoroughly preparing the complex for delivery. And now the state committee accepted it for operation with the evaluation "excellent".

The first and second general contractor administrations of the "Cherepovetskhimstroy" Trust worked hard to bring this moment closer. Technically substantiated construction work was completed on the complex last year, which made it possible for the installers to start their work in January.

An exceptionally important role was played by a multiple flow-line team contract. On the fifth technological line of sulfuric acid, it was introduced for the first time in Cherepovets on the basis of the unit-by-unit form of the organization of construction. The entire complex was divided into four units. The councils for the units included teams of construction and installation administrations, as well as construction superintendents or section heads.

In introducing the unit-by-unit system, the experience of leading construction organizations of the country accumulated, for example, in Murmansk and Karaganda, was used. During the first quarter, a course was conducted in facilities of the "Cherepovetskhimstroy" Trust on the introduction of a multiple contract involving all participants of the construction of the plant, from department heads to brigade leaders of twenty-six construction organizations.

A socialist competition was organized on the principle of a "work relay race" of construction and installation teams, drivers of the motor transportation administration, and teams of industrial enterprises supplying construction materials. The main condition of the competition was the fulfillment of the contractual obligation of the multiple contract and the deadlines. The course of the competition was monitored regularly: every month expanded meetings of the unit council were conducted, when reports of their leaders were presented. The brigade leaders were also present, and the deadlines for the completion of individual types of jobs were coordinated with them.

The system of construction control on the basis of the unit-by-unit system fully justified itself. Of course, there were unavoidable difficulties: there were delays with the deliveries of equipment and construction materials. However, all complicated problems were solved by the builders efficiently, sometimes directly at the construction site.

Technical innovations were used widely, for example, "Tyazhstroy-78" casings, which made it possible to increase labor productivity on concrete jobs.

The bulk of the installation jobs was done by the "Koksokhimmontazh-1" administration. The standard length of the installation of equipment for the fifth technological sulfuric acid line is eighteen months. The installers pledged to shorten this period to eleven months and kept their promise. This was due to the single multiple contract, thorough engineering preparation, installation of equipment in large units and utilization of experience accumulated in the construction of the four preceding technological lines of the production association "Ammofos".

By increasing the output of mineral fertilizers, the chemical workers of Cherepovets are contributing greatly to the realization of the Food Program.

10,233
CSO: 1841/83

NEW AMMONIA PRODUCING UNIT COMPLETED AT TOGLIATTI

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Dec 83 p 1

[Article by N. Chulikhin, Togliatti: "Design Capacity Reached"]

[Text] The end of the year became a turning point in the work of the Production Association "Tol'yattiazot [Togliatti-Nitrogen]": after long interruptions connected with imperfections of the technological equipment, the sixth unit for the production of ammonia has been brought to its design capacity. Now, the daily output of the enterprise is 7400 tons. This association has become one of the largest suppliers of this valuable product.

Local innovators contributed greatly to the development of the plant and modernization of its equipment. They devoted all their talents and all their creative initiative to the search for production reserves. And their searching was very fruitful and very profitable for the enterprise.

10,233

CSO: 1841/83

UDC 66.045.1-462-036.7.678.743.41

FTOROPLAST FRACTIONATING COLUMN

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 10, Oct 83
pp 3-4

YEFREMENKO, I. P., candidate of technical sciences, SUMALINSKIY, G. A., and
MIKHAYLUS', N. G., engineers

[Abstract] "Pavlogradkhimmash" plant has begun series production of tubular plate type polytetrafluoroethylene heat exchange apparatus with heat exchange surfaces of 10 and 32 m², intended for use in fractionating columns. Tests of such heat exchangers under production conditions in fractionating columns, and also as built-in coolers in absorption columns, has shown their high effectiveness in highly corrosive media such as mineral acids. The heat exchange tubes are made of polytetrafluoroethylene, inside diameter 2-3 mm, woven together to form a solid disk of the required outside diameter and height. These disks are placed one above the other, with the free ends of the heat exchange tubes from the lower disks passing through the upper ones to connect them into a single structure. Spacer inserts may be inserted between disks if necessary. The free cross section of the disk and equivalent diameter of the space between the tubes depend on the method of weaving of the tubes in the disk and the arrangement of disks and therefore can be varied in the design of apparatus. Testing of fractionation columns under production conditions has shown that the apparatus operates stably over a broad range of gas and liquid loads. Figures 2; references 2: all Russian.
[47-6508]

UDC 621.593.048:658.382.3

EXPLOSION-SAFE WORKING CONDITIONS OF LIQUID OXYGEN EVAPORATORS

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 10, Oct 83
pp 18-20

GUSTOV, V. F., doctor of technical sciences, FAYNSHTEYN, V. I., candidate of technical sciences

[Abstract] Studies of air separator evaporators damaged by explosions show that in all cases the explosions occurred on the surface of vapor generating

elements, where impurities had accumulated as a result of their liberation from the evaporated liquid, causing the formation of deposits. This article studies the accumulation of explosive impurities in heterogeneous form in oxygen evaporators. The rate of hydrocarbon accumulation was studied on special test stands created for the purpose under conditions modeling the hydrodynamics of air separation in the range of heat fluxes of 1100 to 3800 w/m² with a concentration of hydrocarbons in the liquid oxygen of 0.001 to 8 mg/dm³. The area of optimal hydrodynamic conditions was defined, for which long-term reliable operation of evaporators of various shapes is possible. It was found that evaporators, the surfaces of which are covered with porous metal layers, are more effective than smooth tube evaporators, and that the rate of accumulation of hydrocarbons on these surfaces decreases significantly with the passage of time, so that accumulation of explosion-dangerous hydrocarbon impurities is not a problem with these devices. References 6: 5 Russian, 1 Western. [47-6508]

UDC 661.257

STABILIZATION OF LIQUID SULFUR ANHYDRIDE WITH NITRIC ACID

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 10, Oct 83 pp 611-613

SOLOV'YEV, Yu. M., YEPIFANOV, V. S., LOBOVA, M. V. and VOROSHINA, T. I.

[Abstract] Stabilization of sulfur anhydride with nitric acid was studied using the method of single stage mixing which was based on introduction of components into a stream of 12-15% ready solution circulating through the mixing zone and the refrigerators. Specifically, the study included the addition of components, temperature of mixing, quantity and composition of the product, circulating solution, etc. Basic parameters of the performance of equipment during the experiments were: HNO₃: 1.0-1.8 l/hr; SO₃: 5-10 l/hr; temperature: 33-42°C at various flow points. Based on the experimental results obtained, initial data were analyzed and now can be used to design large tonnage production equipment. Figure 1; references 8: all Russian. [61-7813]

COAL GASIFICATION

UDC 614.841.12

CALCULATION OF UPPER CONCENTRATION LIMITS FOR INFLAMMATION OF VAPORS OF ORGANIC AND METALORGANIC COMPOUNDS IN AIR

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 10, Oct 83 pp 599-600

SHEBEKO, Yu. N., IVANOV, A. V., ALEKHINA, E. N. and BARMAKOVA, A. A.

[Abstract] Upper concentration limits of the inflammation of gases and vapors in air is one of the most important fire hazard indicators. An attempt was made to develop a new method for calculating this value, which could find universal application and was of sufficient accuracy. The formula developed by Shebeko et al. for the concentration of lower limits of inflammation, based on structural components was used: $\phi_u = \frac{100}{\sum_i h_i n_i + \sum_k g_k}$. It was shown

that this model could be applied also to calculate upper limits with sufficient accuracy and general applicability. References 20: 12 Russian, 8 Western. [61-7813]

COMBUSTION

UDC 614.83

ASSURING EXPLOSION SAFETY OF AMMONIUM ABSORPTION PROCESS IN PRODUCING CARBAMIDE BY FLAMELESS COMBUSTION OF INFLAMMABLE IMPURITIES

Kiev KHIMICHESKAYA TEKHOLOGIYA in Russian No 6, Nov-Dec 83
(manuscript received 4 Apr 83) pp 19-21

GRANOVSKIY, E. A., LANDESMAN, Ya. M. and BAKIN, A. V., All-Union Scientific Research Institute for Safety Engineering in the Chemical (?) Insutry, Severodonetsk

[Abstract] Limitations imposed by safety considerations slow production of carbamide for chemical and related uses. Traditionally, explosion safety is achieved by inert gases, thus reducing economic and technical parameters. The present study reports on catalytic flameless combustion to eliminate ammonia from waste gases from the first distillation that are not in the flammable range. Hydrogen in the experimental mixture amounted to 1-9% by volume, which corresponds to natural production conditions. A palladium catalyst was used in a reactor, which is diagrammed and described, at 150-220°C. Results confirmed the elimination of hydrogen from the initial mixture and acceptable amounts of NiO_2 in the waste gases. Figures 3; references 9: 8 Russian, 1 Western.
[88-12131]

KINETICS AND MECHANISM OF OXIDATION REACTION OF GLUCOSE ON PLATINUM ELECTRODE

Moscow ELEKTROKHIMIYA in Russian Vol 19, No 11, Nov 83 (manuscript received 8 Jul 81; after revision, 18 Oct 82) pp 1476-1481

NIKOLAYEVA, N. N., KHAZOVA, O. A. and VASIL'YEV, Yu. B., Institute of Electrochemistry, USSR Academy of Sciences, Moscow; Istrinskoye Division, All-Union Scientific Research Institute for Electromechanics

[Abstract] For precise measurement of blood glucose in diabetics, various oxidation meters involving electrodes have been proposed. The present study reports on such oxidation on smooth platinum electrodes in acid, alkaline and neutral media, recorded on an oscillating polarograph, and compared to adsorption measurements under the same conditions. Results showed that potentiodynamic curves of glucose oxidation were related to hydrogen ionization during dehydrogenation in a first range of 0.05-0.2 volts; a second range of 0.5-0.9 V represented stationary electrooxidation as carbon-containing particles were discharged. The behavior of glucose was similar to that of methanol. The rate of adsorption was not a limiting factor in the range 0.4-0.7; as the upper value was approached, surface coating with chemisorbed glucose fell to near zero. In a second, slower stage of electrooxidation, a chemisorbed carbon-containing particle formed during rapid adsorption; here dehydrogenation played a key role. In general the electrooxidation process of glucose and analogous gluconic acid was very much like that of methanol, formaldehyde and to a lesser degree, formic acid. Figures 5; references 20: 4 Russian, 16 Western.
[80-12131]

ION-SELECTIVE FIELD TRANSISTOR WITH SiO_2 MEMBRANE

Moscow ELEKTROKHIMIYA in Russian Vol 19, No 11, Nov 83 (manuscript received 28 Aug 81) pp 1521-1524

ARUTYUNYAN, V. M., BAGDASARYAN, R. A. and POGOSYAN, A. S., Yerevan State University; Yerevan Branch, All-Union Scientific Center for Surgery

[Abstract] Ion-selective field transistors (ISFT), whose functions are based on the electrochemical properties of ion-selective membranes and on the field effect in semiconductors, have such advantages as small size, quickness of function, low output resistance and possible use as in vivo monitors of ion activities in biological liquids such as blood. To test the possibilities of a metal-oxide-semiconductor transistor with SiO_2 membrane, the authors prepared 60 mm discs of p-type silicon with 4.5 ohm·cm resistance. Oxidization at 1150°C produced an SiO_2 coating 1800 Å in thickness. Devices with 2 ISFT and 2 regular MOS transistors were prepared and sealed, then tested in various concentrations of an NaCl solution. Volt-ampere characteristics showed a periodically-unstable discharge flow from the test transistors, which was attributed in part to retarded surface states at the silicon- SiO_2 interface, and in part to the presence of mobile Na^+ and H^+ ions at the interface with the semiconductor. The SiO_2 membrane was not judged to be an ideally-selective membrane. Figures 5; references 7: 2 Russian, 5 Western. [80-12131]

STUDY OF ANION ADSORPTION ON RUTHERIUM- AND IRRIDIUM-OXIDE ELECTRODES BY RADIOACTIVE INDICATOR METHOD

Moscow ELEKTROKHIMIYA in Russian Vol 19, No 11, Nov 83 (manuscript received 2 Nov 82) pp 1558-1561

ANDREYEV, V. N., KHEKNER, K. -Kh., GLAS, M. and KAZARINOV, V. Ye., Institute of Electrochemistry, USSR Academy of Sciences, Moscow; Institute of Physical Chemistry, Humboldt University, Berlin

[Abstract] The present study reports on the effects of electrode potential and pH factor on adsorption of anions of hydrochloric and sulfuric acids on RuO_2 and IrO_2 , as well as joint effects of those anions during simultaneous adsorption. Radioactive isotopes of British and domestic Soviet manufacture were used as tracers. Measurements were taken after stationary adsorption was attained at a given potential by shifting the electrode potential to the anode or cathode side. Data showed that anion adsorption was independent of electrode potential at 0.0-0.6 volts, while at higher anode potentials, anion adsorption on both tested electrodes decreased. Decreasing pH after reaching stationary anion adsorption levels consistently brought additional anion adsorption up to values typical for a given pH factor. Further tests showed

that to force out adsorbed sulfuric acid anions, 10 times as many hydrochloric acid anions were needed with the RuO_2 electrode, and 500 times as many with the IrO_2 electrode. The pH factor was the determinant, rather than electrode potential, in controlling anion adsorption. Figures 4; references 9: 4 Russian, 5 Western.
[80-12131]

UDC 543.13:543.27

EFFECT OF NATURE OF MACROCYCLIC POLYESTERS ON ELECTRODE AND TRANSPORT CHARACTERISTICS OF LIQUID MEMBRANES

Moscow ELEKTROKIMIYA in Russian Vol 19, No 11, Nov 83 (manuscript received 11 Nov 82) pp 1588-1592

GOLUBEV, V. N. and GUTSOL, A. D., Institute of Inorganic Chemistry, LaSSR Academy of Sciences, Riga

[Abstract] Certain macrocyclic compounds are known to regulate the permeability of biological and model liquid membranes selectively for ions of alkali and alkaline-earth metals. To further knowledge of this phenomenon, the authors studied the role of the nature of such compounds in determining electrode and transport properties of liquid membranes using calomel contrastive electrode and silver chloride polarizing electrodes. Measurements were taken with controlled temperature at $21 \pm 0.5^\circ\text{C}$. Liquid membranes were modified for the tests with 18 different crown esters with heterocyclic nitrogen and sulfur atoms in various salt solutions. While most tested liquid membranes had a cation electrode function, the deviation in calibrated electrode potential-negative concentration logarithm was also dependent on the type of macrocyclic compound being studied. Selectivity for most membranes declined in the descending order $\text{Cu}^{2+} > \text{Ca}^{2+} > \text{Ni}^{2+} > \text{Zn}^{2+} > \text{K}^+ > \text{Li}^+ > \text{Na}^+ > \text{Cs}^+$. Replacing an oxygen atom with nitrogen and sulfur brought increased selectivity for bivalent ions. Where the dimension of a macrocycle cavity was less than those of a complex-forming ion, a "sandwich" structure resulted that was more tolerant of electrode-active substances. Thus, liquid membrane structure was an important determinant of membrane function and reaction to electrodes. Structural formulas (18) of the macrocyclic compounds studied are given. Figures 4; references 10: 9 Russian, 1 Western.
[80-12131]

FERTILIZERS

PROGRESS IN CONSTRUCTION OF MINERAL FERTILIZER PLANTS REVIEWED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 11 Dec 83 p 1

[Article by various reporters: "To Keep the Deadlines: How New Facilities for the Production of Mineral Fertilizer Are Prepared for Delivery"]

[Text] The enterprises for the production of mineral fertilizers and raw materials for them which are being built are very important projects. This is understandable: in order to realize the Food Program, it is necessary to increase constantly the deliveries of fertilizers to the workers in the fields.

Teams of construction and installation subdivisions are working hard in order to fill the program of increasing the capacities of this very important sector of industry planned for this year. "Ammiak [Ammonia]-450" plant in the Togliatti Association "Azot [Nitrogen]", new complexes for the production of potassium fertilizers in the Association "Belaruskaliy" and at the Novo-Solikamsk Potassium Plant have already been put into operation and are producing. Other new facilities will be delivered next.

Below are the reports by our correspondents about the situation at some construction projects of the most important sector of industry during these decisive days.

Chirchik (by R. Tell', Uzbek SSR)

Here, in the Production Association "Elektrokhimprom", the prestart-up work at the new ammonia complex with a capacity of 450,000 tons is nearing completion. Leaders of start-up and adjustment brigades of the "Orgminudobreniya" Trust are reporting one after another about the completion of assemblies, circuits and units. The equipment, machines and devices have already been tested on inert and working media. The water preparation and steam production circuits are operating reliably. The main assemblies of the reforming and compression departments have been fully broken in. Preparatory work on the gas cleaning unit and in the synthesis department is nearing completion.

"Ammiak-450" is one of the most important projects under construction in Uzbekistan which was started in 1981. The general contractor, Chirchik Construction Trust No 160, together with numerous subcontractors organized the work in such a way that approximately one third of the funds are used every year. The headquarters of the construction project created by the Tashkent Oblast Party Committee

was actively involved in the progress of the work. For example, when there was some delay in the installation because nonstandard equipment was not delivered in sufficient quantities through the fault of "Soyuzglavkhimkomplekt", the headquarters found the possibility of placing more than 1,500 orders to various enterprises of the oblast.

They are working on the construction project around the clock. The hourly schedule is closely adhered to, which is due to a considerable degree to the team contract approach: 95% of teams engaged here are working on a self-supporting basis. The salt-elimination plant, water demineralization unit and the boiler room have already started operating. Final preparations are in progress on the central automatic control panel. The special characteristic of the new plant is that for the first time an automated system for controlling technological processes will start operating simultaneously with its start-up.

The work pace at all sections of this huge complex is intense at this time. The pace in the competition is set by the teams of construction workers, installers, and start-up and adjustment workers headed by M. Mokshantsev, G. Medvedev, M. Ovsyannikov, V. Akop'yan, M. Idiatulin and others. It was planned to deliver the complex for operation during the last days of December. But the participants of the project corrected this schedule. It is planned to start producing ammonia on 19 December.

According to Ye. Kalinin, deputy director of the Association "Elektrokhimprom", there will be no delay.

Meleuz (by S. Yevarestov, Bashkir ASSR)

The work on the most important construction project, a sulfuric acid complex at the Meleuz chemical plant, is nearing completion. The sulfuric acid warehouse is completely ready. The product has been delivered here for breaking in the first line of the shop. Power units were put into operation. Constant circuit voltage has been delivered to all departments of the shop. A heat-recovery boiler was installed in the furnace department for continuous drying and alkalization.

All this was achieved through intense work of the people who exerted all their efforts toward one goal: putting the shop in operation. There are many examples of heroic labor. Here is one of them. Nikalay Nikonov's brigade of the Sterlitamak Installation Administration No 2 of the "Vostokneftezavodmontazh" Trust was assigned an urgent job: to install roofing for electric filters.

The brigade leader promised to do it in four days.

The job was completed exactly on time, two times faster than the time provided by the norms.

And although the installation and other subdivisions, particularly the personnel of the Salavat Administration of the "Teploizolyatsiya" Trust, still have to complete a large volume of work, no one doubts that it will be completed successfully. The spirits of all participants of the construction project rose particularly when they learned that a working committee for the acceptance of the

sulfuric acid shop for operation headed by V. Sul'kov, chief engineer of the chemical plant, started functioning at the plant. It gave a high evaluation to the first units that were checked.

Dzhambul (by V. Burenkov, Kazakh SSR)

Two new furnaces and a sodium tripolyphosphate production shop had to be put into operation at the Novodzhambul Phosphorus Plant. The entire complex was divided into sixteen sections with respect to its technological lines. According to the schedule, these capacities are to be put into operation in December.

There were great difficulties in the work on the most complicated objects. However, in spite of this, both furnaces were set up for coking ahead of schedule. The general contractor of the "Dzhambulkhimstroy" Trust is confident that the furnaces will start producing on time. The situation is different at the construction site of the sodium tripolyphosphate shop. Today, one can see dozens of various schedules, the calendar-type, the so-called tape-type and grid-type, at the construction site, in the offices of the trust manager and heads of subcontracting organizations. There are also copies of the "notebook" system according to which meetings of the start-up headquarters are conducted. But what is the value of all these schedules if they are not fulfilled?

Precast concrete and reinforcing materials, bricks and pipes were never delivered on time in the last few months. The schedules for the deliveries of rolled metal were not fulfilled. The Ruzayevskiy Chemical Machine-Building Plant was supposed to deliver neutralizers with drives in the sets. But the machine builders do not even give the time when they will deliver them. Up to this day, there is no exact schedule for the deliveries of 161 units of nonstandard equipment to the construction site. A. Dyatlov, deputy director of the Novodzhambul Phosphorus Plant for capital construction who is responsible for this, gives nothing but empty promises in response to the complaints of the builders and installers. The explanation is very simple: the client participates nominally in the multiple flow-line contract of the builders. In reality, nobody holds him responsible for not observing the schedule.

The group created at the oblast party committee for assisting the performance of construction and installation jobs also displays a strange passive attitude.

"At the present time, it is impossible to give the delivery date for the new shop", says the assistant to the chief engineer of the "Dzhambulkhimstroy" Trust, Yu. Sukhorukov. This creates the impression that no one is responsible for the delivery of equipment in the client's organization. This ruins the multiple flow-line team contract project before it even started.

10,233
CSO: 1841/83

NOVGOROD PRODUCTION ASSOCIATION 'AZOT' STARTED PRODUCING A COMPLEX FERTILIZER

Moscow SOVETSKAYA ROSSIYA in Russian 17 Nov 83 p 1

[Article by L. Aleynik, press center correspondent of the USSR Ministry of Installation and Special Construction Work: "Up to the Design Level: Checking the Fulfillment of Socialist Pledges"]

[Text] The first granules of nitroammophoska, a complex mineral fertilizer, were obtained at the Novgorod Production Association "Azot" [nitrogen].

The chemical enterprise which is the largest in the northwestern part of the country is being expanded and reconstructed. New plants are being put into operation one after another. For example, deliveries of complex fertilizers started last year from the first section of the complex with a capacity of 550,000 tons a year. The second section will be put into operation soon.

"The construction teams have accumulated abundant experience in rapid construction and introduction of new high-quality facilities", said the secretary of the Novgorod Oblast Committee of the CPSU, Fedor Vasil'yevich Kondrin, head of the construction headquarters. Proper organization of the socialist competition on the principle of "Work Relay Race" contributed to their successful work. Cooperation of workers in related professions made it possible to accelerate considerably the pace of construction and to bring the start-up time closer.

Many objects in the first and second sections of the complex are similar in their structure and in the production technology. This also contributed to the shortening of the construction time. For example, the brigades of the Baltic Administration of the "Spetszhelezobetonstroy" Trust of the USSR Ministry of Installation and Special Construction Work, having remembered the experience of the construction of the first granulation tower, set a record: they built 68 meters of the body of the tower in one month, and completed the entire tower 117 meters tall in 60 days. Previous experience helped also the equipment installers. It was necessary to build eight stories within the huge tower and to place 550 tons of technological equipment on them, and to install many dozens of pipelines. The builders and installers set to work together. For example, the brigades of the "Sevzapstal'konstruktsiya" Trust assembled the flooring framework at the construction site near the tower, the Kirishi installation workers from the "Neft-ezavodmontazh" Trust installed the equipment on them, equipping it with pipelines prepared in advance, and the builders of "Novgorogkhimstroy" completed the job

by concreting the floors. Only after that the completed blocks of flooring weighing up to 300 tons were raised to the design heights. The builders shortened the tower installation time by six months.

The cooperation of workers in related professions was also fruitful in other projects. In the construction of the main building, the brigades headed by A. Tarasov, Hero of Socialist Labor, and by Zuyev, USSR State Prize Laureate, from the general contractor Trust No 43 "Novgorodkhimstroy" started the preparation for the below-grade work simultaneously with the best brigade of the "Montazhkhimzashchita" Trust headed by S. Vorob'yev. Having combined special and construction jobs, they completed and delivered ahead of schedule the areas and foundations with a complex chemical protection system for installing the equipment of the main building. It was assembled from metal components by a new advanced method: high-strength bolts were used instead of welding. This saved a considerable amount of steel -- 800 tons, and the labor input by the "Sevzapstal'konstruktsiya" brigade was reduced to one half.

It was stressed by A. Anokhin, chief engineer of Glavkhimmontazh, that the experience in the construction of the first section was useful for the assembling of the floors of the building. The entire job was completed in nine months, while it would have taken a year and a half before.

The construction project has been completed. Specialists are organizing technological operations using new capacities. The instruments of the central control panel have started operating. The construction teams have fulfilled their socialist pledges, and the first granules of fertilizers have been obtained ahead of schedule.

10,233
CSO: 1841/83

UDC 661.832:532.661.832.43

PRODUCTION OF POTASSIUM SULFATE AND NITRATE DURING NITRIC ACID PROCESSING OF APATITE CONCENTRATE INTO NPK FERTILIZER

Kiev KHIMICHESKAYA TEKHNLOGIYA in Russian No 6, Nov-Dec 83 (manuscript received 10 Sep 82) pp 15-17

MULYARCHUK, I. F. and GUMEN, V. I., Kiev State University

[Abstract] Production of potassium sulfate as a separate fertilizer and for mixing with other nutrients is accomplished, among other ways, by converting potassium chloride with magnesium sulfate into the desired compound. Potassium nitrate production is also of interest to Soviet agriculture, but neither of these compounds are receiving sufficient use. The present study reports on processes for obtaining the above compounds from Khibin apatite deposits through processing the latter with ammonium sulfate and crystalline potassium chloride. Stabilization and quality improvements can be achieved by first converting the ore into a liquid phase, then crystallizing, drying and expelling ammonium chloride. This process eliminates the need for monitoring purity, crystal yield and the ratio of potassium sulfate to ammonia. Yields are high, and the resulting compound can also be used for producing potassium nitrate for fertilizer, as well as glass manufacturing and other uses. References 16: 15 Russian, 1 Western.
[88-12131]

INORGANIC COMPOUNDS

UDC 541.44.412+546.621.654

HYDROGENATION OF INTERMETALLIC COMPOUNDS AND ALLOYS OF LANTHANUM AND ALUMINUM

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 1, 1983 pp 41-44

VERBETSKIY, V. N., KOCHUKOV, A. V., ALYYEV, B. Ch. and GASAN-ZADE, A. A.,
Institute of Inorganic and Physical Chemistry, AzSSR Academy of Sciences

[Abstract] An attempt to explain phase conversion occurring in a rare-earth metal-Al-H system involved a study of the interaction of five intermetallic compounds from this system and three alloys with H. LaAl_4 and LaAl_3 did not interact with H under conditions of the experiment while LaAl_2 underwent slight hydrogenolysis. LaAl absorbed H at room temperature up to a composition of $\text{LaAlH}_{2.6}$ with formation of an amorphous hydride phase. Figure 1; references 10: 4 Russian, 6 Western.
[63-2791]

UDC 546.311.151-145.03:536.2

THERMAL CONDUCTIVITY OF SODIUM, POTASSIUM AND CESIUM IODIDE SOLUTIONS IN N-METHYL-2-PYRROLIDONE

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 57, No 11, Nov 83
(manuscript received 24 Jul 82) pp 2873-2875

KLUSHIN, N. D., POGODIN, V. P. and VOROB'YEV, A. F., Moscow Institute of Chemical Technology imeni D. I. Mendeleyev

[Abstract] Heat conductivity coefficients (λ) were determined for KI, NaI and CsI solutions in anhydrous N-methyl-2-pyrrolidone at 298, 323 and 348°K. The values of λ were found to decrease less than 2% as the temperature of the electrolytes and the solvent increased. Furthermore, λ was also decreased to a slight extent (less than 3-4%) when the salt concentration was increased; the extent of decrease was directly correlated with the mass and size of the electrolyte. Figures 1; references 3: all Russian.
[86-12172]

THERMODYNAMIC CHARACTERISTICS OF CERTAIN HYDROXYPEROXIDES

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 57, No 11, Nov 83
(manuscript received 11 Jun 82) pp 2888-2889

VAN-CHIN-SYAN, Yu. Ya., KACHURINA, N. S., PETROVSKAYA, G. A. and CHUCHMAREV, S. K., Lvov Polytechnical Institute imeni Lenin Komsomol

[Abstract] Calorimetric studies were conducted on the enthalpy of formation of tert-butylperoxymethanol-2(I), 1-tert-butylperoxyethanol-2 (II), 1-tert-amylperoxyethanol-2 (III), and 1-tert-butylperoxypropandiol-2,3 (IV). I, II and IV were obtained by the interaction of tert-butyl hydroperoxide with formaldehyde, ethylene oxide, and glycidol, respectively, while III was prepared by the reaction of ethylene oxide with tert-amyl-hydroperoxide. The respective energies of formation ($-\Delta H^\circ$, 298°K) of I, II, III and IV were 480.6, 511.7, 534.2 and 719.2 kJ/mole. Effusiometric studies were used to determine the saturated vapor pressure of these compounds and to calculate the enthalpies of evaporation as 59.6, 66.4, 70.1 and 88.0 kJ/mole for I, II, III, and IV, respectively. In addition, thermodynamic data are also tabulated for certain bonds and for the enthalpies of formation of some biradicals. References 7: all Russian.
[86-12172]

ION EXCHANGE PHENOMENA

UDC 661.183:66-9

COUNTERFLOW ION-EXCHANGE APPARATUS

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 56, No 10, Oct 83
(manuscript received 2 Dec 82) pp 2270-2274

POLTAVTSEV, V. I., Kuzbas Polytechnical Institute

[Abstract] The problem of creating a continuous counterflow ion-exchange apparatus, involving the processes of ion exchange, ionite regeneration and extraction of regenerated materials from the ionite, has been resolved with two-phase dense and boiling layer systems. Features of these systems separately and in combinations have been studied, but the inherent contradictions of various stages of the overall continuous counterflow ion exchange process have received little attention. These include the dynamic balance between flows and technical difficulties in automation and valve systems to maintain use-intervals for transmitting ionites. The author developed a three-phase vortex apparatus with pneumatic mixing and a mass-exchange deflector, which represents an intermediate solution between dense and boiling layer processes. It combines the advantages of both while eliminating many of their shortcomings. The valve system is simplified and ionite destruction minimized, but highly volatile aggressive regenerative substances in the gas phase still pose a corrosion problem. Figures 4; references 9: all Russian.
[82-12131]

NITROGEN COMPOUNDS

UDC 547.78:542.95

BUBBLING METHOD OF VINYLIZING AMIDAZOLE AND BENZIMIDAZOLE AT ATMOSPHERIC PRESSURE

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 56, No 10, Oct 83
(manuscript received 10 May 82) pp 2289-2292

VOROPAYEV, V. N.; DOMNINA, Ye. S.; GLAZKOVA, N. P. and SKVORTSOVA, G. G.,
Irkutsk Institute of Organic Chemistry, Siberian Division, USSR Academy of
Sciences

[Abstract] Promising 1-vinylimidazoles have not previously been produced in industrial amounts. The authors present a further advance of their earlier vinylation process, which involved a gas-liquid emulsion of acetylene with rapid mixing at nearly atmospheric pressure. The modification uses atmospheric pressure and a catalytic bubbling gas in an organic solvent. The reactor vessel was a glass column 0.9 m in height and a 1 liter vessel, with added glass rings to permit greater contact of the catalyst and the acetylene. Cadmium acetate was the catalyst for benzimidazole, and copper monochloride, for imidazole. The lengthened reaction time was compensated for by the simplicity, safety and low energy consumption of the process, which provided 89-91% yield of 1-vinylimidazole and 1-vinylbenzimidazole. Figure 1; references 9: 5 Russian, 4 Western.
[82-12131]

ORGANOMETALLIC COMPOUNDS

UDC 547.256.2 + 547.222

EFFECT OF ULTRASOUND IRRADIATION IN SYNTHESIS OF ALUMINUMORGANIC COMPOUNDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 53, No 11, Nov 83
(manuscript received 29 Oct 82) pp 2519-2527

KUCHIN, A. V., NURUSHEV, R. A. and TOLSTIKOV, G. A., Institute of Chemistry,
Bashkir Branch, USSR Academy of Sciences, Ufa

[Abstract] The goal of the present work was to study the interaction of Al with various mono- and polyhalogenated alkyl radicals while activating the aluminum powder with ultrasound generator. The reactions were performed in diethyl or dibutyl ether, THF and in dioxan, using 1.5 excess of Al. The mixture was exposed to ultrasound for 0.5 hr prior to addition of alkyl halides. The results were satisfactory; many new compounds were obtained which could not be prepared with a mechanical stirrer; the yields of the final products were increased, side reactions were minimized. This new activation method permitted synthesis of novel aluminumorganic compounds from mono- and poly-halogenated alkanes, alkenes and cycloalkanes. References 22: 8 Russian (1 by Western authors), 14 Western.
[84-7813]

UDC 547.256.2

STUDY OF ALUMINUMORGANIC PEROXIDE REACTIONS WITH ALUMINUMORGANIC COMPOUNDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 53, No 11, Nov 83
(manuscript received 18 Jan 83) pp 2527-2536

DODONOV, V. A., STEPOVIK, L. P., SOFRONOVA, S. M. and GRISHIN, D. F., Gorkiy
State University imeni N. I. Lobachevskiy

[Abstract] Several aluminumorganic peroxides were synthesized and their properties were studied in an attempt to determine the routes of formation of oxygen containing compounds. In this effort a peroxide was obtained in which an aromatic alcohol radical served as the alkoxy group: dibenzyl-oxy-tert-butyl-peroxyaluminum, which broke down at 20-80°C yielding benzylaldehyde, tert-butyl alcohol and benzyloxyaluminum oxide. It was discovered that these

aluminum organic peroxides reacted easily with triethyl-, diethylethoxy- and diethoxy-ethylaluminum forming ethyl and tert-butyl radicals. On the basis of EPR data analysis it was concluded that the reactions of aluminumorganic compounds with peroxide occur homolytically. It was decided that the formation of free radicals and hydrocarbons during oxidation of aluminumorganic compounds may occur through the reaction of aluminumorganic peroxide with starting metal-organic compounds. Figures 3; references 26: 16 Russian (1 by Western author), 10 Western (2 by Russian authors).
[84-7813]

UDC 535.379,542.92:547

FORMATION OF COMPLEXES OF ALUMINUM ORGANIC WITH $\text{Ru}(\text{bipy})_3\text{Cl}_2$. CHEMLUMINESCENCE OF THEIR REACTION WITH O_2

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 3, Nov 83
(manuscript received 24 Dec 83 [sic]) pp 617-619

BULGAKOV, R. G., KAZAKOV, V. P., MINSKER, S. K., DZHEMILEV, U. M. and TOLSTIKOV, G. A., corresponding member, USSR Academy of Sciences; Institute of Chemistry, Bashkir Branch, USSR Academy of Sciences, Ufa

[Abstract] The authors report on a reaction of a coordinated metal compound with an aluminum organic compound, in which the latter served as both coordinating and reducing agent. The reaction was conducted in an argon atmosphere with CH_2Cl_2 and $\text{C}_6\text{H}_5\text{CH}_3$ as solvents, and spectral and photographic records made. When the aluminum organic compound was added to $\text{Ru}(\text{bipy})_3\text{Cl}_2 \cdot 6\text{H}_2\text{O}$, which is not soluble in toluene and poorly soluble in CH_2Cl_2 , intensive gas emission occurred, which was attributed to a redox process and crystallization of the water molecules. A bright red chemiluminescence appeared when the resulting compound was oxidized. Further research is needed to determine the exact mechanisms involved in the reactions. Figures 3; references 2: 1 Russian, 1 Western.
[75-12131]

ORGANOPHOSPHORUS COMPOUNDS

UDC 547.241

REACTION OF DIALKYL PHOSPHITES WITH HEXACHLOROACETONE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 53, No 11, Nov 83
(manuscript received 4 Feb 83) pp 2449-2452

KHASKIN, I. G. and MIGAYCHUK, I. V.

[Abstract] The reaction of dialkylphosphite with hexachloroacetone was studied under conditions of haloform breakdown of the latter, which in presence of proton donor reagents yielded chloroform and a trichloroacetic acid derivative. When hexachloroacetone was reacted with dialkylphosphites in presence of triethylamine, the products were isomeric 0,0-dialkyl-0-1,2,2-trichloro-vinylphosphates in 48-63% yield; triethylamine formed a hydrochloride which precipitated out of the reaction mixture. A possible reaction mechanism for this reaction was proposed which required formation of a triethylammonium salt followed by addition of the dialkylphosphorous acid anion to the CO group of hexachloroacetone and rearrangement through an intermediate epoxy compound. References 12: 7 Russian, 5 Western.
[84-7813]

UDC 541.67:546.183

NMR SPECTRA OF ^{77}Se AND ^{31}P COMPOUNDS CONTAINING $>\text{P}(\text{Se})-\text{N}-\text{O}(\text{X})<$ GROUP

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 53, No 11, Nov 83
(manuscript received 8 Feb 83) pp 2452-2456

NIKONOROVA, L. K., YENIKEYEV, K. M., GRECHKIN, N. P., ISMAYEV, I. E.,
IL'YASOV, A. V. and NURETDINOV, I. A., Institute of Organic and Physical
Chemistry imeni A. Ye. Arbuzov, Kazan Branch, USSR Academy of Sciences

[Abstract] Effect of substituents at the phosphorus atom on the shielding effect and spin-spin interaction of Se and X nuclei was studied on a series of $>\text{P}(\text{Se})-\text{N}-\text{P}(\text{X})<$ type compounds (where X = Se, S, O), using ^{77}Se and ^{31}P NMR method. The spectra were determined on WM-250 Bruker instrument in 10 mm ampules at 308 K. It was shown that screening of ^{77}Se nuclei does not differ in these compounds. Based on the values of $J(\text{SePNP})$, $J(\text{PSe})$ and $J(\text{PNP})$, it was proposed that the substituents at the P atom in these compounds are in trans orientation. Figures 2; references 12: 6 Russian, 6 Western.
[84-7813]

REACTIONS OF BENZALACETOPHENONE, DIBENZEL- AND BENZALACETONE WITH PHOSPHONOUS, PHOSPHINOUS ACIDS AND SODIUM DIETHYLPHOSPHITE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 53, No 11, Nov 83
(manuscript received 14 Jul 82) pp 2456-2464

PUDOVNIK, A. N., SOBANOV, A. A., BAKHTIYAROVA, I. V. and ZIMIN, M. G., Kazan State University imeni V. I. Ul'yanov-Lenin

[Abstract] In earlier studies it was shown that α -ketones with dimethylphosphite in presence of Lewis acids, NaOCH_3 or di- or triethylamine in ether yielding addition products along the carbonyl group. Addition to benzalacetophenone, however, went along the 1,4-addition to the double bond system. To find out the dependence of this reaction on the structure of hydrophosphoryl group, the reactions of dimethyl-, dibutyl-, diphenylphosphinous-, and ethyl esters of phenyl- and phenylthiophosphonous acids with benzalacetophenone, benzal- and dibenzalacetone were carried out. With benzalacetophenone, the above reagents gave addition products along the $\text{C}=\text{O}$ group. Benzalacetophenone reacted with dimethyl-, dibutylphosphinous and ethyl ester of phenylphosphonous acids to give respective 1-hydroxyphosphinates and phosphine oxides which upon heating broke down to the starting materials followed by the 1,4-addition of hydroxyphosphoryl compounds. Dibutylphosphinous acid and sodium diethylphosphite added along the $\text{C}=\text{C}$ double bond to the dibenzalacetone. When crotonaldehyde and benzalacetone were reacted with sodium diethylphosphite, the product was 2-oxo-2-ethoxy-5-diethylphosphoryl-1,2-oxaphospholane. Figure 1; references 13: 9 Russian (1 by Western authors), 4 Western.
[84-7813]

REACTIONS OF ETHANOLAMINE WITH TRIVALENT PHOSPHORUS CHLORIDES AND AMIDO DERIVATIVES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 53, No 11, Nov 83
(manuscript received 2 Dec 82) pp 2464-2467

PUDOVNIK, M. A., MIRONOVA, T. A. and PUDOVNIK, A. N., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan Branch, USSR Academy of Sciences

[Abstract] Synthesis of novel N-phosphorylated 1,3,2-oxazaphospholanes was described. Reaction of orthoaminophenol with PCl_3 in presence of Et_3N gave 2-chloro-3-dichlorophosphino-1,3,2-oxazaphospholane (I), b.p. $75-76^\circ\text{C}/0.04$ mm Hg, d_4^{20} 1.5633, n_D^{20} 1.5780. When I was treated with excess diethylamine, the product was 2-diethylamino-3-bis(diethylamino)phosphino-1,3,2-oxazaphospholane (II), b.p. $125^\circ\text{C}/0.06$ mm Hg, N_D^{20} 1.500. Hexaethyltriaminophosphine exchanges a chlorine atom with I to yield 2-diethylamine-3-dichlorophosphino-1,3,2-oxazaphospholane (III), b.p. $128^\circ\text{C}/0.03$ mm Hg, d_4^{20} 0.7905, n_D^{20} 1.5355. Figure 1; references 10: 7 Russian, 3 Western.
[84-7813]

PHOSPHORYLATION AND SILYLATION OF SOME ORTHOBIFUNCTIONAL DERIVATIVES OF BENZENE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 53, No 11, Nov 83
(manuscript received 2 Dec 82) pp 2468-2475

PUDOVİK, M. A., MIKHAYLOV, Yu. B. and PUDOVİK, A. N., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan Branch, USSR Academy of Sciences

[Abstract] Reactions of o-amino- and N-methyl-o-aminothiophenols with di- and triamides of trivalent phosphorus led to the formation of 4,5-benzo-1,3,2-thiazaphospholanes which often occurred in a stepwise progression. In order to determine the order of phosphorylation and comparative stability of intermediate products, reactions of o-aminothiophenols, o-aminophenol and pyrocatechol with diethylchlorophosphite were studied. It was established that the first step in this process was phosphorylation at the hydroxyl or mercapto group followed by intramolecular cyclization to form 4,5-benzo-1,3,2-diheterophospholanes. As a rule, diphosphorylated orthoderivatives of benzene yielded 1,3,2-diheterophospholanes and linear derivatives of trivalent phosphorus or N-phosphorylated 1,3,2-diheterophospholanes with elimination of dialkylamine. References 14: 13 Russian, 1 Western.
[84-7813]

VINYL ESTERS OF PHOSPHORIC ACIDS, PART 26: REDUCTIVE THERMAL BREAKDOWN OF VINYLHYDROXYCHLOROPHOSPHORANES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 53, No 11, Nov 83
(manuscript received 14 Jan 83) pp 2476-2481

KOLODKA, T. V., LOKTIONOVA, R. A. and GOLOBOV, Yu. G., Institute of Organic Chemistry, UkSSR Academy of Sciences, Kiev

[Abstract] A series of vinyloxychlorophosphoranes was synthesized, looking for electronic and steric factors responsible for their thermal stability. The most stable compounds possessed large alkyl substituents in α -position of the vinyl group; they could be distilled without decomposition at temperatures above 100°C. The derivatives containing phenyl radicals were least stable thermally. The breakdown of these compounds was studied by means of NMR^{31P} and PMR spectroscopy as well as with GLC methods. References 10: 4 Russian, 6 Western.
[84-7813]

UDC 547.26.118 + 547.281.1

REACTION OF PARAFORMALDEHYDE WITH AMIDOPHOSPHITES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 53, No 11, Nov 83
(manuscript received 25 May 83) pp 2650-2651

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[Abstract] Reaction of paraformaldehyde with anilides of dialkylphosphoranes (I) and glycolphosphorus acids (II) and with N-diethylamides of diethylphosphorous (III) and glycolphosphorous (IV) acids at 80-120°C for 2-4 hours were being studied. From the reactions of I (R= iso-Pro and Et) and formaldehyde, the product was diisopropyl ester of phenylaminomethylphosphonic acid (V) b.p. 131-134°C/0.035 mm Hg, m.p. 65-67°C, and diethyl ester of V, b.p. 123-126°C/0.01 mm Hg, d_4^{20} 1.4000, n_D^{20} 1.5230. References 3: 2 Russian, 1 Western.
[84-7813]

UDC 547.794:543.422

STRUCTURE OF PRODUCTS OF REACTION OF 2-PHENYL(ACETYL)-5-METHYL-1,2,3-DIAZAPHOSPHOLES WITH METHYLPHENYLDIAZOMETHANE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 3, Nov 83
(manuscript received 11 Apr 83) pp 613-616

ARBUZOV, B. A., academician, DIANOVA, E. N. and ZABOTINA, Ye. Ya., Scientific Research Chemical Institute imeni A. M. Butlerov, Kazan State University imeni V. I. Ul'yanov-Lenin

[Abstract] Continuing earlier study of diphenyldiazomethane (e.g., this journal Vol 244, No 5, 1979 pp 1117-1121), the authors investigated the effect of replacing a phenyl radical with methyl in the reactions of 2-phenyl- and 2-acetyl-5-methyl-1,2,3-diazophospholes. Reactions were conducted at room temperature in pentane solvent, and led to violent emission of nitrogen and mild heating. Infrared, NMR and mass spectra and element analysis showed the structures of the resulting compounds; two isomers formed, with temperature and solvent type having a significant effect on the transition between isomers. The temperature dependency was further studied, and it was determined that when temperature of 150°C was maintained for 35 minutes both transition and polymerization occurred. The polarity of the solvent affected the polarity of an intermediate compound. Further study is suggested to determine the bonds of the phosphirane ring of the bicycle that are involved in cyclic attachment. Figure 1; references 7: all Russian.
[75-12131]

EVALUATION OF POLAR PROPERTIES OF ORGANOPHOSPHORUS COMPOUNDS USING
CHROMATOGRAPHIC DATA

Ivanovo IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: KHIMIYA I KHIMICHESKAYA
TEKHNOLOGIYA in Russian Vol 26, No 10, Oct 83 (manuscript received 10 Mar 83)
pp 1210-1213

RYAZANOVA, L. V., NOVIKOV, V. F. and VIGDERGAUZ, M. S., Department of Analytical
Chemistry, Kazan Chemico-Technologic Institute imeni S. M. Kirov

[Abstract] The authors studied the role of hydrogen bonds and other polar reactions in sorbate retention using as donors and acceptors benzene, ethanol, nitromethane and methylethylketone. Organophosphorus compounds were the sorbents, with various alkyl substituents at the phosphorus atom and various functional polar groups. Polarity was shown to be an important factor in increasing the reaction of electron donors and acceptors as well as proton donors. The length of alkyl groups was not found to be a key factor. Test results are presented graphically in the form of a triangular distribution graph showing organophosphorus compounds and sorbate retention values. Results showed that organophosphorus compounds with nitrile substituents had strong proton-acceptor capacity that determined their hydroxyl selectivity, and can be recommended as sorbents for gas chromatography in separating alcohols and hydrocarbons. Figures 2; references 6: 5 Russian, 1 Western.
[76-12131]

PESTICIDES

UDC 620.193.8:576.8

STUDY OF EFFECTIVENESS OF CERTAIN BIOCIDES FOR SUPPRESSING PLANT BIOMASS IN CLOSED WATER SUPPLY SYSTEM

Kiev KHIMIYA I TEKHNLOGIYA VODY in Russian Vol 5, No 5, Sep-Oct 83
(manuscript received 6 Apr 82) pp 463-465

PAVLENKO, N. I., DAVYDOVA, O. Ye., RAILKO, Z. A. and GVOZDYAK, V. D., Institute of Physico-Organic Chemistry and Coal Chemistry, UkSSR Academy of Sciences, Kiev

[Abstract] Control of plant biomass at various industrial installations, including the Lisichansk petroleum processing plant in the present study, has been accomplished with chlorine or copper sulfate and other bactericides, but these methods have their limitations, including limited effectiveness, corrosion of brass fittings and precipitation of copper hydroxide. The authors determined that microorganisms composed the bulk of plant biomass at the plant water system; most were sulfur-reducing bacteria. For laboratory tests, anaerobic microflora and fungi were also cultured, then attacked with various bactericides. Results showed that the best economically-feasible preparations were Soviet "katamin AB", "katapin" bactericide and formaldehyde, which suppressed all three tested microorganisms at various concentrations. While corrosion from these preparations was judged to be acceptable, further tests are recommended. References 4: all Russian.
[54-12131]

UDC 628.162.84

BACTERICIDE ACTION OF BIOLOGICALLY ACTIVE SUBSTANCES ON E. COLI

Kiev KHIMIYA I TEKHNLOGIYA VODY in Russian Vol 5, No 5, Sep-Oct 83
(manuscript received 26 Feb 82) pp 465-467

KUL'SKIY, L. A., MOROZ, O. G., MUZYCHUK, N. T. and KAYUMOVA, G. Kh., Institute of Colloid Chemistry and Water Chemistry imeni A. V. Dumanskiy, UkSSR Academy of Sciences, Kiev

[Abstract] Plant ethereal oils are known to suppress vitality or to inactivate many microorganisms and bacteria. The present study reports on bactericide action of 7 [unspecified] plant ethereal oils in water and air tests. Of the

numbered substances, #4 was most effective in controlling E. coli in water, followed by #7 and, the least effective, #3. The highest mortality reached was 97%. In air tests, substance #3 was found to be most effective in killing E. coli cells; more resistant were mycelial fungi, followed in order by Klebsiella-genus bacteria, fecal streptococcus, staphylococcus, sarcins, and micrococcus. Only 0.05 mg/m³ was required to kill E. coli cells in the air. Figures 3; references 6: all Russian.
[54-12131]

PETROLEUM PROCESSING TECHNOLOGY

FIRST SECTION OF ACHINSK PETROLEUM REFINERY REACHED DESIGN CAPACITY

Moscow SOVETSKAYA ROSSIYA in Russian 20 Nov 83 p 1

[Article by V. Tanchuk, reporter of LENINSKIY PUT', and A. Shchegolev, reporter of SOVETSKAYA ROSSIYA: "Younger Brother of a Giant", Krasnoyarskiy Kray]

[Text] The first section of the Achinsk Petroleum Refining Plant has achieved its design capacity ahead of schedule.

Two enterprises have the same abbreviation of their names: AMPZ. But the Angarsk and Achinsk petroleum refining plants are separated by 1000 km in space and almost a quarter of a century in time. A flask and a rectifying tower appeared in the emblem of Angarsk since the foundation of the city. But Achinsk acquired this modern enterprise quite recently. People still remember the intense days when the units were started up. The members of shop No 1 in cooperation with a team of adjusters, engineers of the "Orgneftekhimzavody" Trust, tested and rechecked each assembly. Much work was done in the adjustment of mechanical devices by the following: section head V. Isakov, machine operators D. Chadin and N. Sergeyev, and operators V. Artem'yev, S. Antoshchenko, V. Sosnin and V. Pasov. The work of the builders and adjusters was very successful: the first section of the Achinsk Petroleum Refining Plant was brought to the design capacity much ahead of schedule.

The silence in the operation room of the first shop was disturbed only by a weak crackling of the relays. The lights on the control board were shining evenly, and the process of technology was "progressing normally". The people working in the shop were experienced, in spite of the fact that its personnel started forming only a year ago. The point is that many petroleum refiners from Angarsk, including its director A. Dem'yanenko, came to participate in the organization of this plant. The connection between the two AMPZ is very close, in spite of the distance.

Today, hundreds of tank cars with diesel fuel, high-octane gasoline and fuel oil are being dispatched every day from the Novaya Yelovka station, which is right next to the complex. Trains go to all corners of Krasnoyarskiy Kray and to the neighboring Siberian oblasts. Being ahead of the schedule for the design capacities, the personnel of the enterprise has already delivered almost three and a half million rubles worth of products over the planned output. This amount is still going up.

"See for yourselves how important it was to increase the capacities in the shortest possible time", said the secretary of the party committee of the plant, V. Mel'nik, and showed us letters of thanks from rural areas. "We were able to provide fuel for a huge park of machines, tractors, and combines for grain harvesting. We also contributed to the successful fulfillment of the state plan for the procurement of grain, potatoes, and vegetables by Krasnoyarskiy Kray".

Construction work on the petroleum refining plant is continuing. A few days ago the state committee report was signed regarding the acceptance of the first section of the washing and steaming station for operation. Installation workers of the "Sibtekhmontazh" administration from V. Radnayev's and P. Sukhinin's teams are constructing by the contract method reservoirs and intermediate storage areas. It will not be long when consumers will receive liquified gases for domestic and industrial purposes, road asphalt and other valuable petroleum products.

10,233
CSO: 1841/83

NEED FOR A GASOCHEMICAL COMPLEX STRESSED

Ashkhabad TURKMENSKAYA ISKRA in Russian 29 Sep 83 p 2

[Article by S. Shakharov, chief engineer of the technical department of the All-Union Production Association "Turkmengazprom": "A Gasochemical Complex is Needed"]

[Text] Turkmen gas industry workers are successfully solving the problems defined by the Basic Directions of Economic and Social Development of the USSR for increasing the volume of gas production. The teams of the VPO [All-Union Production Association] "Turkmengazprom" consistently fulfill and overfulfill the state plans and their social pledges every year.

However, in my opinion, much attention should be given not only to the problem of rapid exploitation of deposits, but also the problem of their complex utilization. The point is that, so far, we have not learned, and, unfortunately, are not even trying, to extract all useful components of gas and place them at the service of man.

For example, ethane, which is contained in large amounts in the natural gas, has not yet been utilized. For this reason huge resources are lost. Specialists of the VPO "Turkmengazprom" calculated that one year of careless exploitation of deposits causes a damage to the national economy in the amount of 187 million rubles.

But we do need ethane. On its basis it is possible to obtain polyethylene and produce various articles from it, including polyethylene pipes which are needed very much for rural areas. The raw-material base created in Turkmenistan in recent years and the great prospects of individual gas-bearing regions make it possible to start the development of gasochemical plants on a large scale.

Natural gas can give the republic not only ethane, but also the condensate, sulfur and, consequently, engine fuel, gasoline, liquefied gas and further, after reprocessing, plastic materials, industrial rubber products, medical preparations, and consumer goods.

And this, I repeat, is not a fantasy. A gasochemical complex is under construction in Chardzhouskaya Oblast. It is planned to put its first section in operation in 1985. However, the construction of this project is somewhat delayed. The industry workers are unjustifiably slow in solving an important government problem.

In the meantime turbotetander-type gas-processing units are used most widely at foreign gas fields in technological lines for collecting gas and its preparation for transportation.

Certain steps in this direction are being taken in our country. Chemical enterprises have been built and are operating on the basis of gas-condensate deposits in the Orenburg area, in Mubarek in Uzbek SSR and other regions of the country. On the basis of the resolutions of the 26th CPSU Congress, about twenty production territorial complexes have been created, combining more than 4,000 enterprises.

However, this process is very slow in our republic. In essence, the planned complexes are not yet operating. The extraction and use of gas as fuel outstrips its use as a raw material for the chemical industry. The attempts to introduce some insignificant changes into the established scheme are so far unsuccessful. The problem is driven into a deadlock on various pretexts (supposedly, the reserves of the deposits are being exhausted, there are no available funds, or the deadline for developing a gasochemical complex is far away).

Naturally, the resources of deposits are not unlimited. But it is all the more necessary to take advantage of them to the fullest. The residual reserves of the operating fields and the initial resources of the new fields can be and must be exploited compactly particularly if they are located close to one another.

It should be mentioned that the established reserves of ethane-containing gas of the Kirpichli, Beurdeshin, Severnyy Balkui and Malay structures would satisfy the raw-material needs of the chemical industry in ethane for dozens of years.

I would like to propose to the economists three variants for the location of a gasochemical complex of the Turkmen SSR.

The first of them, the Gugurtli variant, presupposes construction of main gas lines from Kirpichli and Malay to Gugurtli and a connecting pipeline from Severnyy Balkui. The length of the line -- up to 395 kilometers, approximate amount of capital investments -- about 103 million rubles.

The second variant is somewhat more expensive. If the pipelines with ethane-containing gas are directed to Neftezavodsk, the total length of the pipeline will be 454 kilometers and the investments will be 171.2 million rubles. After the extraction of ethane, the gas of the northern group of areas, just as that of Malay, will be transported to the center of the country through the Central Asia -- Center Line.

The extraction of ethane and its conversion to ethylene guarantee an annual yield of 200,000 tons of polyethylene and 195 million rubles of profit. The expenses on the construction of the complex will be returned in 6-9 months.

The third variant of the organization of ethane production is to place it directly at the Malay field whose reserves will make it possible to operate small industrial units stably in the course of several decades. A possible future shortage of gas should be compensated by the Sovetabad and other fields of Turkmenistan.

The advantages of complex development of the Malay field are obvious. If the output of the fuel gas will, as is planned, be equal to 24-32 million rubles, then, with the extraction of ethane, the volume of industrial production will amount to 110-135 million rubles, i.e., will be considerably higher. The economic effect in thirty years of exploitation will be more than two billion rubles.

It seems that the above variants of the formation of new chemical enterprises are optimal. However, the possibility of other methods of solving this urgent problem is not eliminated. Unfortunately, scientists of Turkmenia are not studying them and have the same attitude of an indifferent observer as our VPO.

In the meantime, the technical department of the All-Union Production Association repeatedly submitted the problem of the formation of a gas processing department within the VPO for consideration by the management.

Moreover, it was suggested that the VPO should submit to the USSR Gosplan its proposals for solving this problem. However, the department was not formed and the Council of the Ministry of Construction of the Turkmen SSR did not receive from the VPO management any weighty proposals which are so necessary for the national economy and the committee of experts of the Turkmen SSR Gosplan for creating gasochemical industries.

It is hard to accept all this. Indeed, no one in the republic except the VPO, which has extensive rights and considerable resources, will be able to organize this on a solid foundation. Incidentally, the association is called upon to take care of this problem. It is necessary to overcome the narrow-minded departmental approach to this problem and, along with traditional overall indexes, to ensure high quality indexes, i.e., to extract all useful components of natural fuel on a large scale and in an integrated way.

Of course, it is not easy to achieve this. For example, it is easier for the gas industry workers to work with a smaller number of consumers. The acquiring of a new large-scale cooperating chemical enterprise means also new problems of improving extraction of gas and improving the quality of the product. New capital investments will also be needed and the construction volume will increase.

But these difficulties must be handled both by us, gas producers, and by other interested ministries and departments. The creation of the Turkmen gasochemical complex requires the attention of higher agencies.

10,233
CSO: 1841/83

UDC 547.279.3:542.943.7

LIQUID PHASE CATALYTIC OXIDATION OF DIETHYLSULFIDE WITH OXYGEN

Moscow NEFTEKHIMIYA in Russian Vol 23, No 5, Sep-Oct 83 (manuscript received 10 Jun 82) pp 678-683

VLASOVA, L. V., MASAGUTOV, R. M., SHAPIROV, A. Kh., MAZGAROV, A. M. and MASHKINA, A. V., Institute of Catalysis, Siberian Department, USSR Academy of Sciences, Novosibirsk; Scientific Research Institute of Petrochemical Industry, Ufa; All-Union Scientific Research Institute of Hydrocarbon Crude, Kazan

[Abstract] One of the possible methods of utilizing disulfides formed during purification of natural gas from mercaptans may be by oxidizing them according to the scheme: $RSSR \rightarrow RS(O)SR \rightarrow RSO_2SR \rightarrow RSO_2SO_2R \rightarrow 2 RSO_3H$. Using the diethyldisulfide as an example, oxidation of dialkyldisulfides with air oxygen was studied in presence of transition metal compounds. It was shown that oxidation of diethyldisulfide in dichloroethane, in presence of $VO(acac)_2$ leads to its partial oxidation to sulfoacid. An increase in temperature, time of contact and concentration of the catalyst leads to the more stable thiolsulfonate. The formation rate of ethanesulfoacid in presence of the metal chlorides of the IV group diminishes in the order: $V > Fe > Cu > Cr > Mn > Co > Ni > Zn$. Figure 1; references 20: 9 Russian (2 by Western authors), 11 Western. [66-7813]

UDC 66.071.6:546.11:665.6

MEMBRANE GAS-SEPARATION PROCESSES IN PETROCHEMISTRY AND PETROLEUM REFINERY

Moscow NEFTEKHIMIYA in Russian Vol 23, No 5, Sep-Oct 83 (manuscript received 23 May 82) pp 579-595

DURGAR'YAN, S. G. and YAMPOL'SKIY, Yu. P., Institute of Petrochemical Synthesis imeni A. V. Topchiyev, USSR Academy of Sciences

[Abstract] Utilization of membranes for separation of gaseous and liquid mixtures will lead to intensified production in petrochemistry and in petroleum refining; it will permit recovery of valuable components from the effluent,

will lead to savings in crude materials and will assist in development of new production technology. A literature review is presented here which covers the period from 1950 to 1981. The following subtopics were addressed: highly productive membranes; characteristics of membrane isolation of hydrogen, including industrial applications; isolation of hydrogen from methane-hydrogen fraction using flat membranes; membrane gas separation in equipment with tubular fibers; and membrane concentration of oxygen and nitrogen from air. Figures 13; references 42: 16 Russian, 26 Western.
[66-7813]

UDC 665.61.033.22:547[217.4-9+218.1-5]

ISOPRENANES FROM POLISH PETROLEUM

Moscow NEFTEKHIMIYA in Russian Vol 23, No 5, Sep-Oct 83 (manuscript received 19 Apr 82) pp 596-599

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[Abstract] During the 60's isoprenanes were identified in various petroleum sources. Isoprenanes are hydrogenated analogues of aliphatic polyterpenes with a polyisoprene skeleton and a characteristic sequence of methyl substituents in the chain. In the present paper experimental data are reported on an analysis of ten Polish petroleum specimens which contained isoprenanes. The principal source of these isoprenanes appeared to be an unsaturated aliphatic alcohol of plant origin - phytol. The specific distribution of isoprenanes in Polish petroleum was similar to that of oils from other deposits: Romaskinsk, Irkutsk, West Texas, etc. Figure 1; references 8: 3 Russian, 5 Western.
[66-7813]

UDC 547.569.3+621.892.099.6

SYNTHESIS OF S, S¹-DIBENZYL ETHERS OF DITHIODICARBOXYLIC ACIDS AND STUDY OF THEM AS LUBRICATING OIL ADDITIVES

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 1, 1983 pp 51-54

ALIYEV, I. A., ZEYNALOV, F. K., SHAKHGEL'DIYEV, M. A. and KHANLAROV, G. G., Azerbaijan State University imeni S. M. Kirov

[Abstract] Production of S, S¹-dibenzyl ethers of dithiocarboxylic acids by the interaction of diacid chlorides of adipic acid, fumaric acid and phthalic acid with benzylmercaptan without any catalyst or condensing agents in described and discussed. It is shown that these ethers of dithiodicarboxylic acids are effective antiwear and antimicrobial additives for lubricating oils. Figure 1; references 8: 2 Russian, 6 Western.
[63-2791]

STUDY OF FINELY GRANULAR SLAG CONCRETES FOR CONCRETING PIPES OF MARINE UNDERWATER PIPELINES

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 1, 1983 pp 92-96

SHAKHTAKHTINSKAYA, G. G., GAMIDOVA, V. G. and KHIROV, Kh., Kh. Kh., State Scientific Research and Planning Institute of Offshore Oil and Gas

[Abstract] Results of studies of slags from Sumgait pipe rolling plant to determine their suitability for use as filler for special finely granular weighted concretes for concreting pipes are presented and discussed. It was found that these slags are resistant to disintegration and suitable for use as concrete filler. The mass per volume and strength parameters of these slag concretes makes them suitable for ballasting a pipeline with average degree of weighting ($2.65-2.72 \text{ t/m}^3$) and their corrosion resistance makes them suitable for use in sea water. Figures 4; references 2: all Russian. [63-2791]

UDC 547.211

CATALYTIC CONVERSION OF NATURAL GAS BY PRODUCTS OF ITS COMBUSTION

Kiev KHIMICHESKAYA TEKHOLOGIYA in Russian No 6, Nov-Dec 83 (manuscript received 28 Apr 83) pp 21-24

CHALYUK, G. I., VESELOV, V. V., KRIVOKON', A. A. and NOSACH, V. G., Gas Institute, UkSSR Academy of Sciences

[Abstract] To improve the effectiveness of natural gas utilization by regenerating heat from its waste products, the authors studied kinetics of converting stack gases with a nickel catalyst using a flow-through device at ca. atmospheric pressure and $700-850^\circ\text{C}$ temperatures, $1000-4000 \text{ parts}^{-1}$ of methane and methane : oxidant ratio of 1 : 3. The oxidant consisted of nitrogen, CO_2 and water. A formula for expressing methane conversion where CO_2 or a mixture of CO_2 and water vapor is used as the oxidant is presented. The formula also shows the degree of methane oxidation. Results indicate that the amount of residual methane increase rapidly at low temperatures as feed volume is increased. The 31 kcal/mole thermal yield coincides with an earlier finding where methane was converted on nickel foil using CO_2 (KINETIKA I KATALIZ, No 4, 1964, pp 696-705). Figures 5; references 8: 7 Russian, 1 Romanian. [88-12131]

POLYMERS AND POLYMERIZATION

METALLIZATION OF PLASTIC MATERIALS

Moscow METALLIZATSIYA PLASTMASS (NOVOYE V ZHIZNI, NAUKE, TEKHNIKE: SERIYA "KHIMIYA") in Russian No 11, Nov 83 (signed to press 5 Nov 83) pp 2-4, 5, 64

[Annotation, introduction, table on p 5 and table of contents from book "Metallization of Plastic Materials (News in Life, Science and Technology: 'Chemistry' Series", by Mudis Ionovich Shalkauskas, Candidate of Chemical Sciences, Sector Head of the Institute of Chemistry and Chemical Technolgy of Lithuanian SSR Academy of Sciences, specialist in chemical metalization of plastic materials, Izdatel'stvo "Znaniye", 28,840 copies, 64 pages]

[Text] This monograph familiarizes the readers with the properties and application areas of metalized plastic products and with the main directions of their production. The author dwells in more detail on chemicogalvanic metalization which occupies one of the leading places with respect to the volume of production and improvement of the products and also makes it possible to solve many technical problems by a good combination of the positive properties of plastics and metals.

This issue is intended for lecturers, teachers and students of public universities, students of vuzes and technical schools, and for all who are interested in the problems and methods of modern science and technology.

Introduction

Plastic materials, whose output is about seven million tons a year, and metals (~ two hundred million tons a year) are the materials we encounter most frequently today. It seemed for a while that they are competitive and that in the future plastics will supplant metals. In fact, plastics have many advantages in comparison with materials developed earlier. Firstly, their production takes less power and materials, and secondly, it is easier, more convenient, and with less labor input to convert them into finished products. Thirdly, they have attractive operation properties: corrosion stability, low density, and greater variety of types (in practice, about fifty types of various plastics are used). However, it became clear gradually that plastics are not substitutes for metals or other materials, but are independent materials supplementing other materials.

Trying to use more fully the positive properties of plastics and other materials, composite materials are produced from them which sometimes are called composites for the sake of brevity*. Composite materials do not merely combine the properties of the initial components, but also have entirely new properties. Moreover, composites often do not have the drawbacks of the initial materials. They are attractive also because they can be made of raw materials which seem to be not very useful at first glance, such as shavings in timber slabs, crushed stone in concrete, air in cellular polystyrene, expanding in this way the raw-material base of the production of materials (Figure 1).

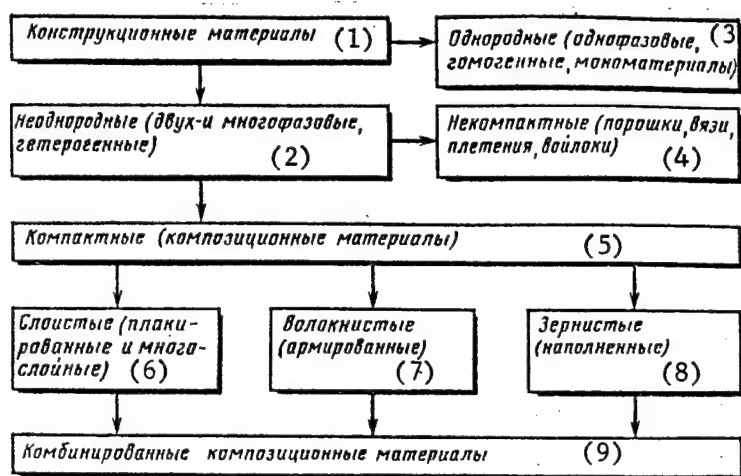


Figure 1. Classification of Construction Materials

Key: 1. Structural materials

2. Inhomogeneous (two-phase and multiphase, heterogeneous)

3. Homogeneous (monophase, homogeneous, monomaterials)

4. Noncompact (powders, viscous materials, netting, felts)

5. Compact (composite materials)

6. Laminated (plated and multilayered)

7. Fibrous (reinforced)

8. Granular (filled)

9. Combination composite materials

Plastics are used for manufacturing many composite materials. The best known of them are glass-reinforced plastics and laminated plastics. Among the latter, special place is occupied by composite materials of plastics and metal**. These are metal plastics and metalized plastics. The former are obtained by covering metal with a plastic material, and second by covering a plastic material with metal.

*See: Rudoy, B. L. "Kompozity" [Composites], Moscow Moskovskiy rabochiy, 1967.

**See: "Metal-Polymer Materials and Articles", edited by V. A. Belyy, Moscow, Khimiya, 1979; Belyy, V. A., and Pleskachevskiy, Yu.M. "Metal-Polymer Systems, Moscow, Zananiye, 1982.

Why do plastics have to be metalized? What advantages do we get by combining materials which are so unlike in their properties?

Table 1
Purposes of Metalization of Plastic Materials

Purpose	Type of Product
Decorative finish	Panels, bas-reliefs, frames, toys, sculptures.
Weight reduction	Axle caps, radiator gratings, housings.
Surface protection	Ashtrays, picture frames, gaskets, seals, photo camera housings.
Increasing wear resistance	Printing heads, gears, protective panels.
Increasing strength	Hangers, handles.
Shielding and reduction of penetrability	Housings, reflectors, dentures, light filters, protective coatings.
Increasing electric conductivity	Cables, printed circuit boards, waveguides, microphone membranes.
Connection by soldering	Fittings, abrasive materials.
Information recording	Magnetic drums, disks, tapes, silverless photography.
Chemical modification	Catalysts, adsorbents, electrodes, pipe lines, filters.

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CSO: 1841/81

UDC 678.046.3:54-116:678.742.2

PRODUCING MODIFIED MINERAL FILLERS FOR FIRE-RESISTANT COMPOSITIONS

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 56, No 10, Oct 83
(manuscript received 24 Jul 81) pp 2324-2328

TUTAYEVA, N. L., KOMAROV, V. S., MARKINA, A. Ya., REVYAKO, M. M. and
BELYAKOVA, M. D., Institute of General and Inorganic Chemistry, BSSR Academy
of Sciences; Belorussian Technologic Institute imeni S. M. Kirov

[Abstract] Increasing fire resistance of construction and finishing materials has involved cheap hydroxides, metal oxides and silicates in recent years, but their introduction has harmed other physicochemical properties. The present study reports on developing copolymers of ethylene and vinylacetate (CEVA) by use of modified aluminum hydroxide and kaolin fillers in their Sb^{3+} -form, chosen because antimony is the most common antipyrretic and its ions can coordinate electron donor molecules and participate in oxidation-reduction reactions with peroxides. Data indicated a limited cross-linking between vinylacetate and aluminum hydroxide and kaolin, not found with the zinc variants of the two fillers. The trivalent antimony ion was the key to this bond for aluminum hydroxide, although the bivalent zinc was more effective in linking kaolin to the vinylacetate. Fire resistance was improved while elasticity increased with the modified fillers. References 10: 5 Russian, 5 Western.
[82-12131]

UDC 678.762.02

SYNTHESIS OF OLIGODIENES WITH TERMINAL ATOMS OF ALKALI METAL BY CONTINUOUS TECHNOLOGY

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 1, 1983 pp 61-65

EFENDIYEV, A. A., KULIYEVA, V. G., MAMEDOVA, A. D., BADALOVA, O. T. and
SHUKYUROVA, Kh. F., Institute of Theoretical Problems of Chemical Technology,
AzSSR Academy of Sciences

[Abstract] Development of an effective technology of synthesis of lithium-containing oligodienes by direct interaction of the monomer with metallic

lithium is described and discussed. Complete conversion of the metal is achieved by this method by repeating the synthesis cycle. The method eliminates the necessity for separating the metal from the reactor products and the need for mechanical mixing. Apparatus used in the procedure is illustrated in schematic diagrams. Figures 2; references 10: 9 Russian, 1 Western. [63-2791]

UDC 541.128+66.097.12+542.948

EFFECT OF POLYMER MOBILITY AND CHAIN LENGTH ON CATALYTIC PROPERTIES OF COMPLEXES OF TRANSITION METALS AND POLYETHYLENEGLYCOL

Moscow KINETIKA I KATALIZ in Russian Vol 24, No 5, Sep-Oct 83
(manuscript received 3 Mar 82) pp 1085-1090

SELEZNEV, V. A., TYULENIN, Yu. P., VAYNSHTEYN, E. F. and ARTEMOV, A. V.,
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[Abstract] Catalytic activity of complexes of unbranched polyethyleneglycol (PEG) and Co, Mg and Cu chlorides in the tetraline reaction was studied. There was found to be an unusual dependence of the catalytic activity of ions of transition metals (Me) in these complexes on the length of the polymer chain and the composition of complexes in the tetraline oxidation reaction. In complexes containing 1 Me on the polymer chain, the catalytic activity increased ~ 10 -fold for CoCl_2/PEG and MnCl_2/PEG and a -fold for CuCl_2/PEG with increase of M from 4000 to 40000 in complexes of composition $\text{MeCl}_2/\text{PEG} = 1:1$. An increase of the number of Me atoms on the chain decreased the atomic catalytic activity 2-fold and 3-fold for CoCl_2/PEG and MnCl_2/PEG respectively. Structural and viscosity characteristics of solutions of PEG and MeCl_2/PEG in tetraline were studied to show the effect of the polymer chain on the catalytic activity of the complexes. The effect of the polymer chain appears at the stage of initiation of free radicals which then leads to an independent chain of oxidation. The main role in the effect of the polymer chain length on the catalytic properties of the complexes with transition metals is played by the effect of non-equilibrium conformations of the polymer chain, arising during catalysis. Figures 3; references 12: all Russian. [62-2791]

CATIONIC POLYMERIZATION OF VINYLACETYLENE

Yerevan ARMYANSKIY KHIMICHESKIY ZHURNAL in Russian Vol 36, No 10, Oct 83
(manuscript received 19 Nov 82) pp 672-675

GRIGORYAN, S. G., KOBRYANSKIY, V. M. and MATNISHYAN, A. A., Institute of
Chemical Physics, USSR Academy of Sciences, Moscow

[Abstract] Studies were conducted on the cationic polymerization of vinylacetylene under conditions in which radical polymerization was excluded in the temperature range -70 to 20°C . The polymer yield was greater with sulfuric acid than in the presence of poly-phosphoric acid, and greater still in the presence of Lewis acids ($\text{SnCl}_4 > \text{TiCl}_4 > \text{SbF}_4$). Furthermore, SbF_4 was even effective at -70°C in promoting an acceptable rate of polymerization. Polymerization involved, predominantly, the 1,4 position with subsequent prototropic isomerization into polyene. Figures 1; references 3: all Russian. [77-12172]

RUBBER AND ELASTOMERS

UDC 678.4

EFFECT OF STRUCTURAL FACTORS ON THERMAL OXIDATION OF CARBON CHAIN RUBBERS

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 56, No 10, Oct 83
(manuscript received 15 Dec 81) pp 2306-2309

BARANETS, I. V., PCHELINTSEV, V. V., NOVIKOVA, G. Ye. and TRUNOVA, L. N.

[Abstract] The kinetics of thermal oxidation destruction of polymers as related to the morphology of macromolecule ordering has received little scientific attention. The present study reports on supermolecular structure of flexible chain diene rubbers during thermal oxidation using a butadiene-propylene copolymer (SKBP-A), cis-1,4-polyisoprene (SKI-3) and cis-1,4-polybutadiene (SKD). Films 1, 20, 40 and 250 mcm in thickness were vaporized from hexane solutions on glass, aluminum or teflon bases, which had decreasing physical relief irregularities in the order given. The ribbon and bead-like structure of the deposited rubbers differed from their original structure in block form. After oxidation, all rubbers had fine globular structure, and differed only in the end size of globules and the nature and number of structural flaws. Apparently the first effect of oxidation was a general destruction of macromolecular order, followed by more specific failures. Rate of oxidation depended on the rubber and base type, with slower oxidation by a factor of 2 on aluminum than on glass. Greater flexibility was accompanied by more rapid disintegration and oxidation. The slowest oxidation occurred on a teflon base. References 11: all Russian.
[82-12131]

UDC 678.742.73:547.21

STUDY OF EFFECT OF CHLOROPARAFFIN ON PROPERTIES OF MIXTURES OF RUBBER AND THEIR VULCANIZERS

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 1, 1983 pp 74-76

DONTSOV, A. A., BILALOV, Ya. M., ABDULLAYEV, M. N. and MAMEDOV, Hk. B.,
Azerbaijan Institute of Petroleum and Chemistry imeni M. A. Azizbekov

[Abstract] Results of an experimental study of technological and physico-chemical properties of binary and ternary mixtures of rubbers containing chloroparaffin are presented and discussed. Properties of compositions

containing chloroparaffin (CP-40), produced at the Sumgait organochlorine products plant, were used in the study. Introduction of CP-40 improved the physico chemical properties of vulcanizers, prepared on the basis of rubbers with various unsaturation while swelling in gasoline and oil was reduced. These changes are associated with change of structure of the mixtures and especially with the more effective dispersion in the composition of polar oil and gasoline resistant rubber, in the presence of CP-40. References 6: all Russian.
[63-2791]

UDC 678.068.019.391+678.06:62-762:541.28

AGING OF RUBBER AND THICKENING AGENTS IN SECONDARY EMISSION FIELDS OF HIGH ENERGY PROTON ACCELERATORS AND Co-60, PART 1

Moscow KAUCHUK I REZINA in Russian No 11, Nov 83 (manuscript received 10 May 82)
pp 9-12

DEGTEVA, T. G., DONTSOV, A. A., ARTEMOV, V. M. and D'YAKOV, Ye. M., Rubber Industry Scientific Research Institute

[Abstract] A variety of rubbers were tested for the effects of exposure to secondary emission fields (1.1×10^{-8} J) of high-energy proton accelerators or to gamma irradiation from a Co-60 source on their physicochemical and mechanical properties. Exposure to doses of 0.5-1.5 Gy (0.1 Gy/sec) had no significant effects on the flexibility of the samples (SKS-85, SKI-3, NK, SKN-26, SKS-30, SKF-26, SKMS-50, SKEP, SKTFV) and they continued to form tight seals when compressed between metal surfaces, with the exception of SKTV which was found to be most susceptible to the effects of irradiation. No meaningful differences were noted between the effects of the secondary fields and Co-60 exposure, despite the fact that the former acts on the nuclei and the latter on the orbital electrons of atoms. Cross-linkage formation was less of a problem with irradiation in the accelerator fields than with Co-60 due to the effects on the carbon atoms and resultant polymer destruction. However, the products of such damage imparted greater frost resistance to SKMS-50-, SKN 26- and SKI-3- based thickening agents.
[87-12172]

UDC 678.7.743:687.028

PENTAERYTHRITE ESTERS OF CARBOXYLIC ACIDS IN VULCANIZATION OF CHLORINE-CONTAINING ELASTOMERS

Moscow KAUCHUK I REZINA in Russian No 11, Nov 83 (manuscript received 8 Jul 82) pp 19-21

KOVACHEVA, Z. A., ZHURAVLEVA, G. A., KOLYADINA, N. G. and TRUFANOVA, N. D., LF [expansion unknown, possibly, Leningrad Branch] Scientific Research Institute of the Rubber Industry

[Abstract] Studies on the improvement of epichlorohydrin and chloroprene rubber demonstrated that the use of pentaerythrite esters (PEE) of carboxylic

acids and monoethanolamine (MEA), rather than powdered pentaerythrite, in vulcanization leads to homogenous preparations that possess superior physical chemical properties. Homogenization was achieved by saponification of the PEE of C₅-C₈ carboxylic acids with MEA at the vulcanization temperature of 151-164°C, which led to product with finely dispersed pentaerythrite. IR spectroscopy of PEE+MEA preparations exposed to 151°C for 40 min showed the disappearance of absorption at 1740 cm⁻¹ (ester bond) with the concomitant appearance of absorption at 3500 cm⁻¹ (hydroxyl groups). Light microscopy of the samples confirmed the absence of visually-demonstrable pentaerythrite crystalline inclusions. Figures 1.

[87-12172]

UDC 678-19.046.2(04)

EFFECTS OF CHLORINATED CARBON BLACK ON MIXED SKEPT-40/SKN-40M RUBBER

Moscow KAUCHUK I REZINA in Russian No 11, Nov 83 (manuscript received 13 Jul 82) pp 21-22

PLEKHANOVA, A. L., CHEKANOVA, A. A., KOSTRYKINA, G. I. and ZAKHAROV, N. D., YaPI [expansion unknown; Yaroslavl' Polytechnic Institute?]

[Abstract] Tests were conducted on the effects of using chlorinated carbon black in the vulcanization of mixed SKEPT-40/SKN-40M (ethyl-enepropylene/butadiene nitrile) rubber on the properties of the product. Studies with carbon black samples containing 1.35-8.4% chlorine showed that the most significant changes consisted of markedly greater resistance to layer separation. The latter observation was ascribed to presumed increase in the number of interphase bonds that were formed between SKEPT-40 and SKN-40M. The structural characteristics of the phases, however, were not affected by the chlorinated carbon black. Figures 1; references 4: all Russian.

[87-12172]

WATER TREATMENT

UDC 628.314.2.66.094.94.546.48

PURIFYING SEWAGE OF CADMIUM WITH SORBENT BASED ON TITANIUM PHOSPHATE

Kiev KHIMIYA I TEKHOLOGIYA VODY in Russian Vol 5, No 5, Sep-Oct 83
(manuscript received 24 Mar 82) pp 418-421

MITCHENKO, T. Ye., STRELKO, V. V., BELYAKOV, V. N. and POSTOLOV, L. Ye.

[Abstract] Production of acetaldehyde by vapor-phase hydration of acetylene on a cadmium-calcium-phosphate catalyst must be followed by removal of cadmium from waste water. Purification with synthetic ion-exchange resins and anionites has proved unsatisfactory. The present study reports on use of inorganic titanium phosphate and the latter's regeneration, and this method is suggested as a more effective alternative procedure. The ionite was mechanically durable and resistant to acids and to thermal hydrolysis. The sewage tested, containing 250-350 mg/l acetic acid, 100-150 mg/l crotonaldehyde and 75-100 mg/l of acetaldehyde, as well as 0.05-10 mg/l of cadmium, had pH of 4-4.5 and temperature of 60-90°C when the sorbent was added. Constant mixing and temperature control were maintained. Results showed that increasing temperature and reducing sorbent particle size both speeded the purification process. The temperature and acidity (above) and ionite granule size of 0.5 mm were regarded to be most effective. The sorbent was completely regenerated in two hours by a 10% nitric acid solution. Deep purification was achieved in 5 repetitions with the same sorbents without its deterioration, and production tests were similarly promising. Figures 5; references 7: all Russian.
[54-12131]

UDC 541.138.2

ELECTROCHEMICAL DECOLORIZATION OF DYE SOLUTIONS

Kiev KHIMIYA I TEKHOLOGIYA VODY in Russian Vol 5, No 5, Sep-Oct 83
(manuscript received 19 Jul 82) pp 421-423

ENDYUS'KIN, P. N., FILIPPOV, V. M., SELEZENKIN, S. V. and DANILOV, S. D.,
Scientific Research Institute for Organic Semi-Manufactured Products and Dyes,
Moscow

[Abstract] Electrochemical removal of dyes and intermediate products of their manufacture is complicated by such factors as activated chloride and oxygen,

direct electrical oxidation on anodes, hydrogen reduction and other factors. The present study reports on membrane- and membraneless electrolyzers. The anode was a titanium disc coated with titanium and ruthenium oxides, the cathode titanium and the membrane asbestos leaf. Approximate dye neutralization conditions of 50°C and pH of 8-9 were maintained. Dyes free of common salt were obtained by recrystallization using sodium sulfate. Results showed a linear relationship between the algorithm of optic density and electric consumption up to 50-80% decolorization for light dyes. For orange-brown dyes, electric consumption was reduced by shortening wave length. Active chlorine formed from sodium chloride was effective in decolorizing active, direct acid dyes. Figure 1; references 5: all Russian.
[54-12131]

UDC 628.337:628.344.001.2

PURIFYING EFFLUENT WATER OF 'ELBOR' PRODUCTION

Kiev KHIMIYA I TEKHOLOGIYA VODY in Russian Vol 5, No 5, Sep-Oct 83
(manuscript received 6 Apr 82) pp 443-447

ROGOV, V. M. and SHVETSOVA, T. L., Ukrainian Institute of Water Management Engineers, Rovno

[Abstract] Production of the superhard cutting material "elbor" leaves considerable chromium, boron, and other suspended particles in effluent water; these contaminants belong to all four phases of dispersion. A staged phase-separation system and natural acidity and alkalinity were found useful in removing many of these compounds, including graphite, $\text{Cr}(\text{OH})_3$ and $\text{Mg}(\text{OH})_2$, as well as in regulating active reactions without adding new reagents. An electrical reduction method is suggested for removing hexavalent chromium that avoids further water contamination with anions. The present study tested the effectiveness of electrical reduction methods that utilize dissolved steel anodes and scrap iron for separated processing of rinsing acid-alkaline waters and concentrated solutions containing chromium formed in "elbor" production. For the latter, a two-stage process in which Cr (VI) was first reduced to Cr (III) by iron sulfate and atomic nitrogen, and then neutralized by alkali for precipitation, was proposed. Results showed that the amount of sulfuric acid in the solution, dynamics of acid consumption in dissolving iron filings, initial Cr (VI) concentrations and the ratio of iron filings to waste water all had important roles in the process. Extracting boron from hydroxides of Cr (III), Fe (III) and Fe (II) was closely tied to the pH factor, with best extraction at pH of 8-10. Electrical processing and subsequent alkaline treatment and steeping brought boron to acceptable levels, and the tested processes offer promise of a closed rinsing system with further improvement. Figures 2; references 6: 5 Russian, 1 Western.
[54-12131]

DECOLORIZATION OF WASTE WATER FROM FINISH DYE PRODUCTION AT TEXTILE PLANTS

Kiev KHIMIYA I TEKHOLOGIYA VODY in Russian Vol 5, No 5, Sep-Oct 83
(manuscript received 10 May 82) pp 450-452

BONDAR', V. G., ZIMA, S. V., PIVTORAK, A. I. and TKACHENKO, L. I., Kiev
Construction Engineering Institute

[Abstract] Small concentrations of synthetic dyes in water bodies affect organoleptic parameters and unfavorably interfere with the activities of organisms. Biological and other current purification methods are insufficient for the assorted direct, active, acidic, basic, sulfuric and other dyes used in textile colors. The present study considered ways for decoloring and neutralizing common textile dyes by an ozonization method. The tested dyes had pH factors of 7.0-9.5, pigmentation threshold to transparency of 1:800-1:10,000, chemical oxygen consumption < 1000 mg/l and synthetic surface-active substance concentration of < 150 mg/l. Waste water samples came directly from textile plant effluent; tests were conducted at the plant with ozone-generating and bubbling air-ozone mixing equipment. Results indicated complete purification, with the best decolorization coming with active and direct dyes, and the worst with vat dyes, where supplemental dyeing substances consumed a portion of the ozone. The ozonization method is recommended for treatment of the most colored waste water before its incorporation with remaining plant sewage. References 9: all Russian.
[54-12131]

PRELIMINARY FLOTATION PURIFICATION OF EFFLUENT FROM SUGAR PRODUCTION PLANTS

Kiev KHIMIYA I TEKHOLOGIYA VODY in Russian Vol 5, No 5, Sep-Oct 83
(manuscript received 12 Jul 82) pp 452-454

SAKHNENKO, V. V., Kiev Construction Engineering Institute

[Abstract] The presence of difficult-to-oxidize organic substances, such as saponin, in effluent from third-category sugar production plants requires as much as two full days for biological purification. The present study reports on research into optimum parameters for flotation precleaning of such waste water in a glass column 10.7 cm in diameter, with liquid level between 1 and 4 m and flotation conducted in a constant flow system. A countering effect was obtained by water flow from top to bottom and aeration from the bottom of the column. Determination of saponin extraction, reduction of chemical oxygen consumption and the ratio of flotation condensate to processed water showed that with increased intensity of aeration, condensate volume increased, while with longer time of flotation it decreased. Results indicated the optimum parameters to be aeration at $100 \text{ m}^3/\text{m}^2 \cdot \text{hour}$, duration of 60 minutes, and column length of 2 m. These parameters have been proved in full-scale operations at the "Chervonoznamenskiy" Sugar Plant. Figures 3; references 3: all Russian.
[54-12131]

OBTAINING ALKALI WITH SIMULTANEOUS DEMINERALIZATION OF WATER IN ELECTRODIALYZER WITH SEMI-BIPOLAR MEMBRANES

Kiev KHIMIYA I TEKHOLOGIYA VODY in Russian Vol 5, No 5, Sep-Oct 83
(manuscript received 22 Jun 82) pp 454-456

ANTONOV, Yu. A., PONOMAREV, M. I., VOLKOV, S. A. and GREBENYUK, V. D.,
Institute of Colloid Chemistry and Water Chemistry imeni A. V. Dumanskiy,
UkSSR Academy of Sciences, Kiev

[Abstract] Simultaneous distillation and brine production has been hampered in earlier studies by deposits of calcium carbonates on the dialyzer membrane, requiring further alkalization. The present study reports on use of the electrodialyzer produced at the Alma-Ata Electromechanical Plant, with ion-exchange membranes containing 65 chambers for desalinization and concentration of minerals. The apparatus is diagrammed and described in operation. The electrodialyzer acidifies the brine while the dialysate is partially alkalized and desalinized. The latter causes significant increases in electric consumption, and other aspects of operation need improvement, but in general the semi-bipolar membranes were found suitable for simultaneous distillation of salt water and alkali production. Figures 2; references 6: all Russian. [54-12131]

STUDY IN FLOCCULATION OF E. COLI CELLS AND NATURAL RUBBER LATEX BY CATION FLOCCULANTS

Kiev KHIMIYA I TEKHOLOGIYA VODY in Russian Vol 5, No 5, Sep-Oct 83
(manuscript received 3 Jun 82) pp 459-462

SOLOMENTSEVA, I. M., TESLENKO, A. Ya., BARAN, A. A., MEDVEDEV, Yu. V.,
GIRFANOVA, T. F. and LAZARENKO, Ye. N., Institute of Colloid Chemistry and
Water Chemistry imeni A. V. Dumanskiy, UkSSR Academy of Sciences, Kiev

[Abstract] To improve water purification by removing bacteria, the authors studied patterns of flocculation of E. coli cells and of natural rubber latex used in their colloid chemistry model. Data showed that flocculation depended more on the ion composition of the intermicellar medium than on the nature of particles of the dispersion phase. Increasing the charge on polyelectrolyte molecules brought improved flocculation; this phenomenon was related to electrophoretic mobility of the particles in the presence of the copolymers employed, diethylaminoethylmethacrylates with acrylamide. Particles become fixed in floccules most efficiently when the homopolymer (without acrylamide) was used as the flocculant; its use is recommended for removing E. coli from human and industrial sewage, at a dosage of $2.5 \cdot 10^{-3} \div 1 \cdot 10^{-2}$ mg/10⁹ cells. Figures 5; references 14: 10 Russian, 4 Western. [54-12131]

STUDY OF SALT ESCAPE DURING FIRE PURIFICATION OF EFFLUENT

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 10, Oct 83 pp 596-597

RASYUK, N. I., GORBATENKO, V. Ya. and IGLIN, Yu. S.

[Abstract] The goal of the present study was to determine the regulations and characteristics of trapping and escape of salts during fire purification of effluent using a new type of equipment. Effluent containing mineral and organic impurities was studied. It was concluded that during this process rapid melting of salt particles was due to the heat generated by combustion of easily inflammable organic mixtures and not due to the supply of outside heat source. It was established that the content of small salt particles (up to 5 μm) in the combustion chamber was much greater than could be expected from the pulverization of effluent in the gas stream; hence a lot of it must have formed in the combustion chamber during their evaporation and combustion. Escape of various salts intensified with increased temperature of the process. The principal factors determining the escape of particles are sublimation and formation of finely dispersed salt particles due to microbursts of effluent drops during their evaporation. Figures 3; references 5: 5 Russian, 1 Western. [61-7813]

MAXIMUM PERMISSIBLE CONCENTRATION OF BENZTHIAZOLE AND 2-MERCAPTOBENZTHIAZOLE IN BIOCHEMICAL PURIFICATION OF EFFLUENT

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 10, Oct 83 pp 598-599

REPKINA, V. I., DOKUDOVSKAYA, S. A., UMRIKHINA, R. A. and SAMOKHINA, V. A.

[Abstract] Due to the widespread presence of benzthiazole and 2-mercapto-benzthiazole (2-MBT) in industrial effluent, it was of interest to determine their maximum permissible concentrations. The experiments were performed in laboratory conditions. The results showed that benzthiazole was completely biodegraded up to its concentration of 300 mg/l. The 2-MBT solution by itself was not biodegradable at all; but in combination with benzthiazole it too was degradable; maximum concentration of the mixture of benzthiazole and 2-MBT which could be biodegraded was 300 mg/l and 10 mg/l of these agents respectively. [61-7813]

MISCELLANEOUS

UDC 543.275.1

STUDY OF EFFECT OF OXYGEN DISSOLVED IN SEA WATER ON BEHAVIOR OF ANTIMONY METAL OXIDE ELECTRODE

Ivanovo IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: KHIMIYA I KHIMICHESKAYA TEKHNLOGIYA in Russian Vol 26, No 10, Oct 83 (manuscript received 4 Mar 82) pp 1201-1204

MARININA, G. I. and RADAYEV, Ye. F., Department of Analytical Chemistry, Far East State University

[Abstract] As an alternative to toxic and mechanically unreliable thallium electrodes for determining oxygen in water, the authors studied an antimony electrode by direct potentiometry and pH measurements in natural and synthetic sea water. The potential of the test electrode was in linear dependence on dissolved oxygen in the water at levels above 2 ml/liters. Thus the electrode behaved both as a metal oxide and as an oxygen electrode. Oxygen content was a more important determinant than chlorine content, and pH and the nature of the buffer solution did not affect the sensitivity of the antimony electrode, which was judged to be an effective indicator for potentiometric measurement of oxygen dissolved in sea water. Figures 3; references 10: all Russian. [76-12131]

UDC 543.61:547.5

PRINCIPLES UNDERLYING EXTRACTION OF PHENOLS FROM AQUEOUS SOLUTIONS WITH HALOGEN-CONTAINING SOLVENTS

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 57, No 11, Nov 83 (manuscript received 18 Jun 82) pp 2773-2776

KORENMAN, Ya. I., Voronezh Technologic Institute

[Abstract] Studies were conducted on the partition coefficients for a number of phenols (phenol, 4-methyl phenol, 3,5-dimethyl phenol, 2-hydroxybenzoic acid, 2,6-dinitrophenol, 3-nitrophenol, etc.) between an aqueous solution and organic solvents consisting of halogenated benzene and methane derivatives (chloro-, bromo-, iodobenzene; chloroform, bromoform, 1,2-dichlorobenzene,

dichloromethane, tetrachloromethane). A definite relationship prevailed between the partition coefficients for the phenol among the various extractants, indicating that such relationships can be used for predicting the effectiveness of a given solvent as an extractant. In addition, the efficiency of the halobenzenes was dependent on the halogen and the number of halogen atoms on the benzene ring, with the monohalogens showing greater efficiency. Similar considerations applied to the methane derivatives. In general, the methane derivatives were more efficient than the benzene derivatives. The experimental data also demonstrated that the bromine compounds were less efficient in the extraction of phenols from aqueous solutions than the chlorine compounds.

Figures 1; references 5: all Russian.

[86-12172]

CSO: 1841

- END -